



# **CLOSEOUT REPORT**

## **COMBE FILL SOUTH LANDFILL**

**Chester and Washington Townships, Morris County**

### **OPERABLE UNIT NO. 1 REMEDIAL ACTION**



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### I. Executive Summary

The Combe Fill South Landfill is a Superfund site located on Parker Road in Washington and Chester Townships, Morris County, New Jersey. The landfill operated from the 1940's until 1981 without being properly capped. Following the completion of studies and a remedial design, a contract was bid in February 1992 for the Operable Unit No. 1 Remedial Action. Seven bids were received, and on September 24, 1992 Foster Wheeler Enviresponse, Inc. (FWEI) was awarded Contract A52766 for \$26,016,780. The scope of the contract included landfill contouring, installation of a multi-layered cap, site work, and installation and operation of ground water and landfill gas collection and treatment systems. The contract duration, excluding systems operation, was specified as 915 days for Substantial Completion and 975 days for Final Completion. Accordingly, Substantial and Final Completion were required by March 28, 1995 and May 29, 1995, respectively. These dates were subsequently extended to July 3, 1995 and September 1, 1995, respectively.

FWEI mobilized in January 1993, but site work did not begin in earnest until June 1993. From June 1993 through 1994, FWEI concentrated and progressed significantly on the landfill cap. Significant work on the treatment facility buildings and equipment did not begin until Fall 1994, and by this time the landfill gas system was eliminated from the contract. In 1995 considerable progress was made at the treatment facility and the cap was largely completed. During 1996 FWEI focused primarily on the treatment system and initiated plant start-up in late October 1996. Facility operation was intermittent, and FWEI left the project in late February 1997 without completing start-up and without achieving Substantial and Final Completion.

The resident engineer was O'Brien & Gere Engineers, Inc. (OBG), who was engaged under Contract S88125 for the amount of \$3,849,116. OBG also completed construction work that FWEI refused to perform. Through OBG's efforts, Substantial Completion was declared on September 20, 1997. OBG's affiliate, O'Brien & Gere Operations, Inc., operated and maintained the completed project for one year beginning in September 1997 under a contract for \$975,570.<sup>1</sup>

Other consultants included Barba-Arkhn International, Inc. (BAI) and Shapiro, Lifschitz, and Schram, P.C. (SLS). BAI consulted on construction claims from 1993 until 2003 under Contract R1000451, which was originally for \$449,280.59. SLS was retained by the New Jersey Attorney General's office in 1997 to provide legal defense against FWEI's construction claims.

The total construction-related project cost for Operable Unit No. 1 exceeds \$61,000,000. This cost is broken down as follows: (1) Payments to FWEI totaling \$38,891,783.11, which include a \$15 million claims settlement; (2) \$7,918,487.60 for OBG; (3) \$576,276.80 for O'Brien & Gere Operations, Inc.; and (4) \$3,474,588.59 for BAI. These contract costs include change orders. Additionally, over \$10 million was expended as of May 2007 for outside legal counsel to defend against FWEI's construction claims.

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<sup>1</sup> The 1-year period after project completion is a shake-down period termed the Operational and Functional (O & F) period. This report includes the O & F period but does not discuss the operation and maintenance phase, which began in September 1998.



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## II. Contract/Contractor

### A. FOSTER WHEELER ENVIRESPONSE, INC.

Invitation For Bid No. X-25633, entitled *Remedial Construction at Combe Fill South Landfill*, was issued in March 1992. This bid was an open competitive solicitation for tasks including landfill contouring, installation of a multi-layered cap, site work, and installation and operation of ground water and landfill gas collection and treatment systems. Prospective bidders received four addenda during April and May 1992, and bids were subsequently opened on June 16, 1992. Seven responsive bids were received. The bidders and their corrected bid prices were:

1. Foster Wheeler Enviresponse.....	\$26,016,780.38
2. Laidlaw Environmental Services (FS) .....	\$30,986,359.23
3. Conti Environmental Inc. ....	\$32,222,111.00
4. GeoCon Inc. ....	\$32,472,600.41
5. Carbro Construction Joint Venture with Fischbach & Moore .....	\$33,926,492.25
6. Brecco Mechanical Group.....	\$36,806,539.95
7. Anselmi & DeCicco .....	\$37,985,601.50

The Notice of Intent to Award Contract went out on July 7, 1992. There were no bid protests. The construction contract, A52766, was awarded to Foster Wheeler Enviresponse, Inc. (FWEI) on September 24, 1992. FWEI mobilized to the site in January 1993 and maintained construction crews there until late February 1997. After FWEI left the job, it performed some wrap-up work mostly off-site for several months thereafter.

During the project twenty-four negotiated change orders were issued to FWEI. These totaled \$1,835,976.00. The change orders are listed below. A more complete discussion of FWEI change orders is found in Section VI of this report.

1. Notice of Award (CO 93-010RA-10) .....	\$0.00
2. Tower Grounding I (CO 94-010RA-11) .....	\$7,831.55
3. Parker Road Drainage (CO 94-010RA-12) .....	\$26,573.31
4. Tower Grounding II (CO 94-010RA-13) .....	\$4,172.23
5. Gabion Filter Fabric (CO 94-010RA-14) .....	\$1,656.00
6. Additional Excavation I (CO 94-010RA-15) .....	\$472,225.00
7. Test Pits (CO 94-010RA-16) .....	\$7,757.50
8. Permanent Road Partial Deletion (CO 94-010RA-17) .....	\$408.82
9. Additional Excavation II (CO 95-010RA-18) .....	\$654,725.00
10. Air Monitoring (CO 95-010RA-19) .....	\$3,081.49
11. Assorted T&M Work (CO 94-010RA-20) .....	\$10,947.96
12. Perimeter Road Elevation (CO 95-010RA-21) .....	\$2,397.00



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13. Drums I (CO 95-010RA-22) .....	\$19,548.80
14. Mark-ups (CO 95-010RA-23) .....	\$383.86
15. PVC Conduit Credit (CO 95-010RA-24) .....	(\$7,603.00)
16. DCA Modifications I (CO 95-010RA-25) .....	\$13,000.00
17. Cap Extensions and Drainage (CO 95-010RA-26) .....	\$166,090.98
18. Embankment Unit Price Escalation (CO 95-010RA-27) .....	\$313,500.00
19. DCA Modifications II and Process Modifications (CO 96-010RA-28) .....	\$57,882.00
20. Cap Surface Water Controls (CO 96-010RA-29) .....	\$29,497.50
21. Light Switch Relocations & Pipe Material Change (CO 96-010RA-30) .....	\$920.00
22. Grounding Conductor (CO 96-010RA-31) .....	\$127.00
23. Pipe Material Changes (CO 96-010RA-32) .....	\$1,981.00
24. Drums II (CO 96-010RA-33) .....	\$48,872.00

During the course of the project, FWEI proposed or used subcontractors and suppliers to assist in the performance of the work. The subcontractors or suppliers are tabulated below.

NO.	SUBCONTRACTOR OR SUPPLIER	WORK DESCRIPTION
1	A.C. Schultes, Inc.	Licensed well driller; approved but never used.
2	AER Construction & Equipment Rental	Clay supplier, clay layer installer, and FWEI's labor broker.
3	Ally Meehan, Inc.	Subcontractor of The Conditioning Co.; installed plant septic system.
4	American GeoTech, Inc.	Testing laboratory for geotextile.
5	American Tank Co.	Subcontractor of U.S. Filter Corp.; erected and painted welded steel storage tanks.
6	ATC Systems, Inc.	Electrical subcontractor of The Conditioning Co.; performed work on HVAC system.
7	Bigler Associates, Inc.	Licensed treatment plant operator.
8	Burrell Scientific, Inc.	Supplied laboratory equipment and supplies; installed laboratory metal casework.
9	Cacon, Inc.	Earthwork subcontractor of Rand; left project in early 1994.
10	Casale Industries, Inc.	Fabricator and erector of metal stairs, ladders, handrails, and catwalk.
11	Concrete Cutting & Breaking Co.	Concrete core drilling at plant.



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No.	SUBCONTRACTOR OR SUPPLIER	WORK DESCRIPTION
12	The Conditioning Co., Inc.	Mechanical work such as plumbing & HVAC; utilized several subcontractors.
13	Consolidated Steel & Aluminum Fence Co., Inc.	Fence supplier and installer.
14	Crett Construction, Inc.	Subcontractor of The Conditioning Co.; sheet metal work for HVAC system.
15	Current Electric	Electrical subcontractor; approved but never used.
16	Donald J. Parks, Inc.	Authorized supplier of Varco Pruden buildings; did not work on site.
17	Douglas Environmental Services, Inc.	Coordinator of geotechnical field activities; approved but never used.
18	Effective Air Balance, Inc.	Subcontractor of The Conditioning Co; performed HVAC system balancing & testing.
19	Empire Soils Investigations, Inc.	Licensed well driller; approved but never used.
20	Fine Painting and Decorating, Inc.	Field painting; not used by FWEL.
21	French & Parrello Assoc., Inc.	Geotechnical testing, primarily on-site.
22	Garden State Surveying, Engineering & Planning, Inc.	Licensed surveyor.
23	General Video Inspection	Video inspection of drainage layer piping.
24	GeoPacific Lining, Inc.	Installer of cap geotextile & geomembrane.
25	Goldstar Flooring	Installer of floor tile and base coving.
26	Hardin Huber, Inc.	Licensed well driller.
27	Industrial Corrosion Management	Certified laboratory.
28	International Technology (IT) Corporation	Certified laboratory; merged with Enseco in 5/94.
29	Landmark Fire Protection, Inc.	Designed carbon dioxide fire suppression system.
30	Mt. Hope Rock Products, Inc.	Soils supplier.
31	National Fence Systems, Inc.	Approved with bid but not used.
32	Nordling, Dean Electric Co.	Electrical subcontractor.
33	ORR Associates, Inc.	Labor broker for FWEL.



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NO.	SUBCONTRACTOR OR SUPPLIER	WORK DESCRIPTION
34	Palco Linings, Inc.	Geotextile installation.
35	Papp Iron Works, Inc.	Proposed for metal fabrication & erection but not used.
36	Power Electric Co., Inc.	Electrical subcontractor; replaced by Nordling, Dean.
37	Princeton Testing Laboratory, Inc.	Certified laboratory for air sample analyses.
38	Proline, Inc.	Approved with bid but not used.
39	Pro-Tech Security Services, Inc.	Guard service.
40	R.A. Data, Inc.	Furnished & installed potable water treatment system equipment.
41	Rand Environmental Services, Inc.	Primary subcontractor responsible for most of site work; terminated by FWEI on or about 5/26/94.
42	Rolling Doors of L.I.C., Inc.	Furnished & installed overhead doors for plant.
43	S & D Sales, Inc.	Furnished plant bathroom furnishings; installed bathroom lockers.
44	S & W Waste, Inc.	Waste transportation & disposal.
45	Samuel Stothoff Co., Inc.	Licensed well driller.
46	SDA Electrical Contractors, Inc.	Electrical subcontractor; replaced Nordling, Dean.
47	SLT North America	Installer of flexible membrane.
48	Spark Electric Co.	Approved with bid but not used.
49	SR-1, Inc.	Soil supplier.
50	Stella Contracting, Inc.	Site clearing.
51	Suppression Systems, Inc.	Furnished & installed carbon dioxide fire suppression system
52	Testwell Craig Testing Labs, Inc.	Approved with bid but not used.
53	U.S. Filter, Inc.	Furnished process equipment including SBR's, inclined plate settler & sand filter.
54	Van Ness Mechanical, Inc.	Plumbing subcontractor to The Conditioning Co.
55	Vollers Excavating & Construction, Inc.	Proposed subcontractor for replacement of Cacon; did minor work on job.





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NO.	SUBCONTRACTOR OR SUPPLIER	WORK DESCRIPTION
56	William A. DeCoster, Inc.	Masonry subcontractor; approved but never used.
57	Wimpey Minerals USA, Inc.	Paving subcontractor.

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**B. O'BRIEN & GERE ENGINEERS, INC.**

O'Brien & Gere Engineers, Inc. (OBG) provided construction oversight-resident engineering services for the project as part of its work on Contract S88125. The scope and price for these services were negotiated by OBG and the State, and an agreement was reached on September 18, 1992 for the amount of \$3,849,116. OBG formally entered into Contract S88125, which was a cost plus fixed fee contract, in January 1993. It is noted that construction oversight-resident engineering was an optional service that was identified in the design contract under which OBG had been working since December 24, 1987. This design contract, A70350, was a site-specific engagement off of the rotation list established for the generic X-464 Term Contract for Performance of Engineering Design Services.

OBG's specific responsibilities as the resident engineer included the following:

- Monitoring, inspecting, testing, and approving or rejecting the work of the construction contractor and its subcontractors;
- Interfacing with the construction contractor and the State representatives;
- Interpreting the contract documents and providing additional information where needed for the contractor to fully understand or execute the scope of work or the project design;
- Evaluating requests for additional compensation or contract time by the construction contractor;
- Reviewing the project schedule and monitoring the work progress against the schedule;
- Reviewing, commenting upon, and approving submittals and plans by the construction contractor;
- Participating in and documenting progress meetings attended by the construction contractor, the engineer, and the State;
- Preparing project records, including reports, photographs, and record drawings;
- Evaluating payment requests by the construction contractor;
- Field surveying of the work to verify layout and payment quantities; and
- Preparing an operation and maintenance manual for the treatment facility.

As part of its work, OBG employed the services of the following subcontractors:

NO.	SUBCONTRACTOR	WORK DESCRIPTION
1	Enseco	Certified laboratory for air sample analyses.



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NO.	SUBCONTRACTOR	WORK DESCRIPTION
2	Industrial Corrosion Management a/k/a ICM	Certified laboratory for soils analysis.
3	Quanterra Environmental Services, Inc.	Certified laboratory for air sample analyses.
4	Taylor Wiseman Taylor	Licensed land surveyor.
5	Tectonic Engineering Consultants	Geotechnical services.

During the project there were twenty-four Change Orders issued to OBG. These totaled \$4,320,730.83. The Change Orders are listed below. A more complete discussion of OBG Change Orders is found in Section VI of this report.

1. Extension of Construction Supervision Services (CO 96-010RE-01)..... \$550,010.25
2. Effectiveness Monitoring (CO 96-010RE-02) ..... \$39,138.73
3. Extension of Construction Supervision Services (CO 96-010RE-03)..... \$231,942.65
4. Extension of Construction Supervision Services (CO 97-010RE-04)..... \$296,967.30
5. Cap Drainage System Repairs (CO 97-010RE-05) ..... \$830,691.24
6. Extension of Construction Supervision Services (CO 97-010RE-06)..... \$298,482.20
7. Extension of Construction Supervision Services (CO 97-010RE-07)..... \$271,936.13
8. Perimeter Ditch Cleanout (CO 97-010RE-08) ..... \$26,611.24
9. Temporary Plant Shutdown (CO 97-010RE-09) ..... \$99,014.02
10. Cap Drainage System Repairs (CO 97-010RE-10) ..... \$182,744.08
11. Treatment Facility Substantial Completion (CO 97-010RE-11) ..... \$400,938.69
12. Extension of Construction Supervision Services (CO 97-010RE-12)..... \$287,800.85
13. Cap Drainage System Repairs (CO 97-010RE-13) ..... \$51,226.99
14. No-Cost Time Extension of Construction Supervision Services  
(CO 98-010RE-14)..... \$0.00
15. Cap Substantial Completion (CO 98-010RE-15) ..... \$77,982.74
16. Extension of Construction Supervision Services (CO 98-010RE-16)..... \$154,932.98
17. Final Completion (CO 98-010RE-17) ..... \$395,296.52
18. Mowing (CO 98-010RE-18)..... \$14,750.00
19. Landfill Gas Emissions Testing (CO 98-010RE-19)..... \$9,211.55
20. Phase Loss and Voltage Protection (CO 98-010RE-20) ..... \$13,131.50
21. No-Cost Time Extension of Construction Supervision Services  
(CO 98-010RE-21)..... \$0.00
22. Cap Drainage Repairs (CO 99-010RE-22)..... \$2,921.17
23. No-Cost Time Extension of CO 96-010RE-02 Effectiveness Monitoring



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(CO 99-010RE-23)..... \$0.00  
24. Insulation Replacement (CO 99-010RE-25) ..... \$85,000.00

OBG maintained an on-site presence at the landfill from January 1993 until December 1997. Office support related to project closeout continued through October 1998.

**C. O'BRIEN & GERE OPERATIONS, INC.**

An affiliate of OBG, O'Brien & Gere Operations, Inc. (OBG Ops), operated and maintained the ground water treatment facility and the site grounds during the one year period beginning on September 23, 1997. This work was performed under waiver of advertising no. P-180, and the total contract amount was \$975,570. Originally, this work was to be performed by FWEI as part of its construction contract; however, because FWEI did not achieve Substantial Completion of the project, the State was required to employ other contractors to complete the work, including operation and maintenance services. Because OBG Ops had extensive knowledge of the plant design and construction, it was selected so that operation of the treatment facility could commence without further delay.

The scope of services for OBG Ops included the following major activities:

- Operating and maintaining the ground water treatment facility equipment, including the recovery wells, the ground water force main, the treatment train, and the structures housing the equipment;
- Responding to alarms and emergencies, both when the plant was manned and after-hours;
- Maintaining the landfill cover, including mowing of the grass; and
- Maintaining the site grounds.

OBG Ops used several subcontractors during the performance of its work as follows:

NO.	SUBCONTRACTOR	WORK DESCRIPTION
1	AC Daughtry	Security system maintenance and central monitoring station services.
2	Auchter Industrial Vac Services	Waste broker.
3	Emerald Electric	Licensed electrician.
4	O'Brien & Gere Laboratories, Inc	Certified laboratory for waste water analyses.
5	QC Labs, Inc.	Bioassay.
6	Trijay Systems, Inc.	Automated control system service.

There were no change orders during the contract. OBG Ops concluded its services on September 22, 1998, and on September 23, 1998 a new contractor assumed control of the operation and maintenance of the plant under a competitively bid contract.



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**D. BARBA-ARKHON INTERNATIONAL, INC./NAVIGANT CONSULTING, INC.**

The Claims Mitigation Consultant Services Contract R1000451 was awarded to Barba-Arkhn International, Inc. (BAI) on September 30, 1993.<sup>2</sup> This contract was awarded via a waiver of advertising due to the technical nature of the services required, as well as the need to procure claims mitigation consultant services as quickly as possible. Because this bid was not advertised, only a limited number of potentially qualified bidders were given the opportunity to bid on this work. Only firms with the appropriate experience, personnel and location in close proximity to the site and the NJDEP offices were given copies of the Request For Proposal. Bids were mailed on July 15, 1993 to five firms. Three addenda were issued in July 1993. On August 4, 1993, three bids were received and opened. The responsive bidders and their corrected bid prices included:

1. Barba-Arkhn International, Inc. ....\$449,280.59
2. Hill International, Inc. ....\$491,892.00
3. O'Brien-Kreitzberg and Associates, Inc. ....\$519,333.00

The Notice of Intent to Award Contract went out in August 1993, and there were no bid protests. As previously noted, the Contract was awarded to BAI in September 1993. As bid, BAI's scope under this contract required it to perform work under four distinct tasks for a period of thirty-three months, ending on or about June 20, 1996. Task 1 was *Contract Familiarization* under which BAI was required to review all contract documents, drawings, correspondence, etc. related specifically to the CFSL project. BAI was then to provide a "Task 1 Report" recommending changes to NJDEP contract documents in general, to avoid or mitigate claims in future projects. Task 2 was *Project Assistance* under which BAI conducted regularly scheduled site visits to observe the on-going work, review relevant contemporaneous correspondence, and meet with the NJDEP or resident engineer representatives in order to identify and mitigate potential claim situations. Task 3 was *Claims Review* under which BAI performed preliminary claim assessments, and if requested by the NJDEP, detailed claim analyses. This task involved the following areas of expertise: as-planned vs. as-built schedule review, evaluation of claim issues, schedule impact analysis, loss-of-productivity analysis, and damages analysis. Task 4 was *Claims Negotiation and Resolution* under which BAI assisted the NJDEP in preparing for negotiations, providing advice to NJDEP's engineers or legal staff, and assisting the NJDEP in negotiation discussions if necessary. BAI's primary goal under this task was to help settle claim issues in order to avoid litigation. The tasks were combined under BAI's first change order in November 1995.

BAI used two subcontractors during the performance of its work as follows:

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<sup>2</sup> Navigant Consulting, Inc. acquired BAI in March 2001. The former BAI continued to perform under the name of Peterson-Barrington, the construction and government contracts unit of Navigant Consulting, Inc.



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NO.	SUBCONTRACTOR	WORK DESCRIPTION
1	Citadel Engineering & Construction Consultants, L.L.C.	Claims consultation by several former BAI employees who had actively worked on the project prior to their formation of Citadel. Required in order to ensure continuity
2	Ianieri, Giampapa & Co., Inc.	Auditing of certain limited FWEI financial records in order to provide a preliminary assessment of the damages asserted by FWEI.

During the project, thirteen change orders totaling \$3,366,563.93 were issued to BAI, as listed below. A more complete discussion of BAI change orders is found in Section VI of this report.

1. Subcontracting/Redistribution of Original Contract Funding (CO 96-010CM-01) ..... \$0.00
2. Extension of Claims Mitigation Consultant Services (CO 97-010CM-02) ..... \$0.00
3. Audit of FWEI Financial Records by Subcontractor (CO 97-010CM-03) ..... \$0.00
4. Extension of Claims Mitigation Consultant Services (CO 97-010CM-04) ..... \$103,468.05
5. Extension of Claims Mitigation Consultant Services (CO 97-010CM-05) ..... \$110,079.89
6. Extension of Claims Mitigation Consultant Services (CO 98-010CM-06) ..... \$222,056.59
7. Extension of Claims Mitigation Consultant Services (CO 98-010CM-07) ..... \$549,291.15
8. Extension of Claims Mitigation Consultant Services (CO 99-010CM-08) ..... \$0.00
9. Extension of Claims Mitigation Consultant Services (CO 99-010CM-09) ..... \$259,861.46
10. Extension of Claims Mitigation Consultant Services (CO 01-010CM-10) ..... \$644,534.58
11. Extension of Claims Mitigation Consultant Services (CO 01-010CM-11) ..... \$887,138.67
12. Extension of Claims Mitigation Consultant Services (CO 03-010CM-12) ..... \$590,133.54
13. Extension of Claims Mitigation Consultant Services (CO 03-010CM-13) ..... \$0.00

BAI remained active on the project until March 2003.

**E. SHAPIRO, LIFSCHITZ AND SCHRAM, P.C.**

In November 1997 Shapiro, Lifschitz and Schram, P.C. (SLS) was appointed as Special Counsel to the State of New Jersey. This appointment was made by the Attorney General with the approval of the Governor pursuant to N.J.S.A. 52:17A-13. The engagement was made in order to provide litigation counsel to craft an appropriate strategy to defend the interests of the State regarding the lawsuit brought by FWEI in June 1996. Prior to that time, the State's Division of Law self-performed this work. SLS used experts and vendors during the performance of its work as follows:



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No.	EXPERT/VENDOR	WORK DESCRIPTION
1	Arcadis, Geraghty & Miller, Inc.	Engineering Expert
2	Christman, Mary C.	Statistician (Expert)
3	Court Reporters/Transcript Services (various)	Stenography-Provision of transcripts
4	Document Reproduction and Control Vendors (various)	Electronic Document Capture-Management and Photocopying
5	Esrig, Melvin I.	Soils Expert
6	K & F Consulting, Inc.	Forensic Accounting Experts
7	Simpson Gumpertz & Heger, Inc.	Coatings (Painting) Expert
8	Total Service Company	Engineering Expert

**F. CHESTER TOWNSHIP**

Chester Township was contracted to overlay and otherwise perform repairs to Parker Road in 1994. This work was required because of the massive trucking operation associated with importation of cap materials and with the generally poor condition of Parker Road at the beginning of the project. Two purchase orders were issued totaling \$67,007.09.

**III. Contractor and DEP Key Staffing**

**A. FOSTER WHEELER ENVIRESPONSE, INC.**

For FWEI, as the construction contractor, the key staff member was the project manager (PM). FWEI had four different PM's during the project. The FWEI PM's were Arvid (Chip) Seaburg; John Gerstenlauer, P.E.; Ronald Mis; and Richard A. Hall, P.E. The PM had overall responsibility for bringing in the project on time and within budget. In order to do this, the PM was required to effectively oversee and integrate project planning and performance. Below the PM, FWEI assigned other key field staff to the project. These staff included field superintendents, a health and safety officer, quality assurance officers, and engineers.

Beginning in summer 1994, the FWEI field superintendents were Herman Calvo for the landfill work and Joseph Wright<sup>3</sup> and Robert Coppola for the treatment facility work. Prior to this time, field superintendent duties were fulfilled by one of FWEI's major subcontractors, Rand Environmental Services. John Brasse and William Teresavage performed Rand's superintendence. The field superintendents' duties included ensuring that construction progressed timely and in accordance with technical direction provided by FWEI engineering.

<sup>3</sup> Mr. Wright departed the site in 1995, and Mr. Coppola assumed all of his duties. Prior to this time, Mr. Coppola was primarily responsible for painting of the pre-engineered buildings' steel.



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Additionally, they coordinated the efforts of the various labor categories in their respective areas to effectively get work performed.

The health and safety officer (HSO) was Thomas Hawthorne. His responsibilities included maintaining a safe working environment both in the landfill and treatment facility, daily air monitoring, daily safety briefings, and staff training.

The Quality Assurance Officers (QAO's) were Antonio Gargiulo (1993-1995), Tom Husted (1994-1995), and Greg Ferrari (1995-1997). The QAO's independently audited the work for contract conformance and arranged for testing as needed to verify compliance. They were also responsible for the preparation of daily quality assurance project reports.

The treatment facility engineering staff<sup>4</sup> consisted of the following key individuals: chief engineer Nick Volpe, electrical engineers Sat Gupta (1994) and Mark Scarborough (1995-1997), instrumentation engineer Jeff Hodges, and mechanical engineer Steve Jordan. The engineers used the treatment facility design documents to initiate the shop drawing process and then provide direction to the field staff constructing the project. The chief engineer was in charge of the engineering personnel and coordinated their efforts. He also interfaced directly with the field superintendents in an effort to ensure the engineering instructions were followed and the project schedule was met. The electrical, instrumentation, and mechanical engineers focused on their respective specialties and were responsible for some design work, shop drawing preparation and submission, construction instruction preparation, and inspection and testing of the work and the process equipment.

In addition to the field staff, there was a level of FWEI upper management directly involved in the project. This included Stephen Gangemi<sup>5</sup>, the Executive Director of Projects to whom the project manager reported; and Sam Box, the General Manager of Foster Wheeler Environmental Corporation to whom Mr. Gangemi reported.

### **B. O'BRIEN AND GERE ENGINEERS, INC.**

For OBG, as the construction supervision/resident engineering contractor, the key staff member was the resident engineer (RE), also known as the resident project representative. OBG had two resident engineers during the project. The first RE was Marcy Newman, P.E. who acted in this capacity from September 1992 to July 1994. Ms. Newman was replaced in July 1994 due to being an expectant mother. Newman's replacement was Wayne Hoagland, P.E, who was the RE until OBG's demobilization from the project in December 1998. The RE was in charge of the OBG field staff and was the primary point of contact for the FWEI PM and the NJDEP field staff. In addition to these duties, the RE presided over the progress meetings and was responsible for the meeting minutes.

OBG employed various field inspectors on the project. The two inspectors who were on the project the longest and inspected the most work were Steve Wescott (site work and plant) and

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<sup>4</sup> There was FWEI engineering involved in constructing the landfill; however, office engineering was needed to a much lesser extent than that which was required for the treatment facility and is not discussed in this report.

<sup>5</sup> For part of the project Mr. Gangemi's office was in the field, but he was not directly involved in the construction effort.



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Steve McClelland (site work). In addition, Andy Crabbe inspected the installation of the clay layer. The inspectors were required to inspect FWEI's work to ensure contract conformance and to witness testing. They also prepared daily reports detailing the construction crew and its activities.

Another person who reported to the RE in the field was Michael Mashaw. Mr. Mashaw reviewed shop drawings and coordinated the shop drawing comments between OBG's field and office staffs. He also inspected some of the work and witnessed acceptance testing of the equipment. Field support for acceptance testing and start-up of the treatment facility was also provided by OBG's affiliate, O'Brien & Gere Operations, Inc. In particular, Martin Williams was on site on an almost full-time basis beginning in 1995 in anticipation of this work.

Primary office staff assigned to the project included Mr. Hoagland's supervisor, Robert Bowers, P.E., who served as the Contract Administrator. OBG's construction supervision efforts were headed by Peter McMaster, P.E., Vice President. Critical OBG office engineering staff included Steve Anagnost, P.E. for the landfill; and Judy Allen-Mangiacapra, P.E., Al Saikkonen, and Ron Harting for the treatment facility.

**C. O'BRIEN & GERE OPERATIONS, INC.**

As discussed above, OBG Ops assisted the resident engineering effort related to treatment facility acceptance testing and start-up. Martin Williams was the primary individual who fulfilled this responsibility. When FWEI departed the site in 1997 without finishing the project, OBG Ops provided a staff for plant start-up and operation. The scope of this work is discussed more fully in Section V. The staff included Mr. Williams as the project manager, Stephen Wassel as the New Jersey licensed N-4 operator, Ronald Overholt as the New Jersey licensed N-2 operator, and one technician. Kenneth Gerbsch, to whom Mr. Williams reported, provided technical support for the work. Overall responsibility for the project was retained by Peter McMaster, P.E., President of OBG Ops.

**D. BARBA-ARKHON INTERNATIONAL, INC./NAVIGANT CONSULTING, INC.**

BAI key staff consisted of its CFSL project managers. From 1993 until his death in August 1998, Dr. Robert Myers was in charge of BAI's claims consultation on the CFSL project. During 1995, Dr. Myers left BAI and formed Citadel Engineering & Construction Consultants, L.L.C.; however, he continued to work on the project as a subcontractor to BAI. After Dr. Myers' death, lead responsibility resided with Evans Barba. Under both Dr. Myers and Mr. Barba, Fritz Marth provided the main staff level input required to assist NJDEP in administering FWEI's claims.

**E. SHAPIRO, LIFSCHITZ AND SCHRAM, P.C.**

Shapiro, Lifschitz and Schram, P.C. (SLS) key staff consisted of the partner in charge of the CFSL litigation, Judah Lifschitz, Esq., and his lead CFSL associate, James McMichael, Esq. Together, Lifschitz and McMichael put together NJDEP's litigation defense. This included work





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on document production, depositions of fact and expert witnesses, preparation and arguing of motions both for and against NJDEP, preparation of and responding to interrogatories, and overseeing the preparation of expert reports.

### F. NJDEP

The Bureau of Construction<sup>6</sup> staffed the project for the NJDEP. Specifically, three Construction Managers (CMs) were assigned to the project on a full-time basis. The CMs were Jesse Robbins, Paula Walshe and Charles Dispoto. Mr. Robbins was designated as the lead CM. The CM's role was to provide field oversight of the construction contractor (FWEI) and the engineering contractor (OBG). Later, oversight of the operations contractor was also required. In addition to ensuring that all work was in conformance with contract specifications and regulatory requirements, the CMs maintained a log of the construction activities, prepared reports, and reviewed and recommended progress payment applications and contract modifications for both FWEI and OBG.

The CMs reported to Denis Prince, P.E., Section Chief, and George King, P.E., Bureau Chief. The Section Chief directly supervised the CMs and had day-to-day knowledge of project proceedings. The Section Chief reported to the Bureau Chief, who had project-wide knowledge and who was the liaison between NJDEP upper management and the field.

In addition to these personnel, other NJDEP personnel were part of the Combe Fill South Landfill project team. These staff and their positions were as follows: Gregory Giles, Geologist; Kenneth Petrone, Technical Coordinator; Mark Herzberg, Community Relations Coordinator; Edward Putnam, Assistant Director; and Anthony Farro, Director. On an as-needed basis Deputy Attorneys General Burton Weltman, John Reilly, Mary Ellen Halloran, Eileen Kelly, and Section Chief Richard Engel, of the Division of Law provided legal advice to the NJDEP staff.

The NJDEP, who was the lead regulatory agency for the CFSL remedial action, interfaced with the USEPA, which provided significant funding for the project. The primary contacts for the USEPA were Silvina Fonseca and later Pamela Baxter, who were the Remedial Project Managers.

### IV. Site Description

The Combe Fill South Landfill site address is 98 Parker Road in Chester Township, Morris County, New Jersey. A site location map is presented in Figure 1 below. The landfill property is some 115 acres and extends into portions of both Washington and Chester Townships.<sup>7</sup> As remediated, the final cap area is over sixty-two acres with about another twenty acres occupied primarily by the treatment facility, drainage ditches, site roads, and detention basins.

<sup>6</sup> The Bureau of Construction is now known as the Bureau of Investigation, Design & Construction. At the time of the field work, the Bureau of Construction was part of the Division of Publicly Funded Site Remediation within the NJDEP Site Remediation Program.

<sup>7</sup> In Chester Township the CFSL property is on Block 17 Lot 7. In Washington Township the CFSL property is on Block 37 Lots 15, 16, and 16.01.



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Historically, the site operated from the 1940's through 1981. Some five million cubic yards of refuse were estimated to be contained within the landfill. The majority of waste was household waste and non-hazardous industrial waste. The site was listed on the National Priority List in 1983. The Remedial Investigation Feasibility Study (RI/FS) was performed in 1984 and 1985. During the RI/FS a wide range of chemical contaminants was revealed. These contaminants were consistent with the known uses of the site and the variety of wastes accepted, and they persisted in ground water, surface water and the atmosphere. Volatile organic compounds were identified within both the unconsolidated and consolidated aquifers on and around the site. Ground water contamination was, and continues to be, migrating northeast and southwest and was predicted to possibly increase in concentration with distance from the landfill. The FS specifically identified residents on Schoolhouse Lane, which is less than one-half mile from the landfill as being at risk because ground water is the primary source of potable water in the immediate area surrounding CFSL.

The USEPA signed the Record of Decision (ROD) in September 1986. O'Brien & Gere Engineers, Inc. was awarded the site-specific Remedial Design contract in December 1987. The construction documents were completed in February 1992.

The technical components of the chosen alternative from the ROD that were the basis of the remedial design were:

- Alternate water supply for affected residences <sup>8</sup>;
- Active landfill gas collection and treatment <sup>9</sup>;
- Expanded environmental monitoring;
- Multi-layered cap;
- Collection and treatment of the unconsolidated portion of the aquifer;
- Surface water controls;
- Security fencing, access road, and site preparation; and
- Feasibility Study to evaluate the need for remediation of the deep aquifer. <sup>10</sup>

## V. Description of Construction Work Performed

The constructed elements are divided into two basic parts. The first part is work related to the landfill cap, and the second part is work related to the treatment facility. In addition, the site had to be prepared and certain general site work had to be done. The work elements are listed and described below.

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<sup>8</sup> In February 1995 the alternate water supply was indefinitely suspended by the USEPA.

<sup>9</sup> Active gas collection and treatment was not built because testing of the landfill gas in 1994 revealed that passive venting was appropriate.

<sup>10</sup> Work on this was started in 2003.



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### Mobilization

This included setting up and furnishing trailers for FWEL, OBG and the NJDEP; cutting in and otherwise constructing an access road; and setting up temporary utilities.

### Site Clearing and Grubbing/Debris Removal

This covered the landfill and treatment facility areas, as well as other areas where there was surface debris such as automobiles and empty drums. The clearing work entailed both light vegetation removal and tree removal with stump grinding.

### Landfill Contouring and Trimming

To facilitate the capping, refuse had to be rough graded, shaped and compacted to eliminate ponded and excessively sloped areas and to provide a generally smooth, firm area for the landfill cap. In addition, because about two-thirds of the site property was too limited to accommodate the cap tapering outward, perimeter strips of the existing fill had to be excavated to full depth and deposited within the final cap limits. These excavations then had to be properly backfilled. As a result of these operations the final cap area of 62.2 acres was established. These operations required the relocation of some 213,000 cubic yards of refuse and unclassified fill.

### Gabion Wall

In those areas where there was insufficient property to accommodate the cap tapering outward, the landfill cap was terminated at a six foot high gabion retaining wall. The wall consisted of PVC coated wire gabion baskets filled with stone. The bottom half of the wall was 4.5 feet wide, and the top half was 3 feet wide. Some 5,553 feet of wall was installed.

### Embankment Layer

This is the cap base, and it consists of 1 foot of compacted common fill placed upon the graded and compacted refuse. The material is compacted to 95% Modified Proctor effort. This layer is the sub-base for the clay layer and is made up of some 100,000 in-place cubic yards of material.

### Clay Layer

This is the very low permeability layer meant to keep water from infiltrating into the landfill and generating more ground water contamination. The clay is installed on top of the embankment layer and has a two foot minimum thickness and a maximum water permeability of  $10^{-7}$  centimeters per second. Given the 62.2 acres of cap and two foot clay layer thickness, some 200,700 cubic yards of in-place clay is installed.

### Liner

In those cap areas with a final slope of 10% or less, very low density polyethylene liner was installed on top of the clay. A total of 1,202,700 square feet of liner was installed. This covered some twenty-eight acres.

### Geotextile Filter Fabric

There were two primary applications for the geotextile. The first application was placement on top of the clay in areas not overlain by liner. This was to enhance cap slope stability. Some



Prof. 7/2/06  
CAP is needed

thirty-four acres of geotextile was installed for this purpose. The second application was placement on top of the drainage layer (discussed below). This was to act as a filter to minimize fine-grained soil particles (fines) from migrating into the drainage layer from the cap layers above the drainage layer. Some sixty-two acres of geotextile was installed for this purpose. In addition geotextile was used to minimize fines migration along the edge of cap and under certain cap surface water drainage structures.

#### Drainage Layer

This is the high permeability layer underlying the vegetative and topsoil layers of the cap. It provides a means to quickly drain water from precipitation that seeps through the cap. The drainage material is placed above the liner/geotextile. For this project, use of synthetic material, as opposed to naturally occurring sand, was allowed. The material used was basically crushed and washed granite. The drainage material was installed with a one foot minimum thickness and a minimum water permeability of  $10^{-2}$  centimeters per second. Given the 62.2 acres of cap and one foot drainage layer thickness, some 100,350 cubic yards of in-place drainage material was installed.

The drainage layer also has some 14,694 feet of four inch diameter PVC pipe regularly spaced within it. This pipe intercepts water percolating into the drainage layer and in turn transmits it off the cap. This reduces the contact time the water has with the clay layer, thereby reducing the likelihood of water entering the refuse and consequently enhancing slope stability.

#### Vegetative Layer

This layer was installed on top of the geotextile material above the drainage layer and was generally meant to provide frost protection for the clay and to allow space for the grass cover's deeper roots to establish. The material used was basically common borrow. The vegetative material was installed with a 1.5-foot minimum thickness. Given the 62.2 acres of cap and 1.5-foot vegetative layer thickness, some 150,525 cubic yards of in-place vegetative material was installed.

#### Topsoil Layer

This layer was meant to provide a seedbed for the grass cover. The material used was basically common borrow augmented with leaf compost. The topsoil material was installed with a half foot minimum thickness. Given the 62.2 acres of cap and half foot topsoil layer thickness, some 50,175 cubic yards of in-place topsoil was installed.

#### Seeding

Grass was planted in a prepared seedbed that included fertilizer and lime, and was covered with mulch in order to provide a stable vegetative cover for the sixty-two acre cap. In general, the seed cultivars consisted of an eighty percent fescue mixture, ten percent rye mixture, and ten percent 'other seed' mixture.

#### Surface Water Controls

The surface water controls are designed to control rainwater that doesn't seep into the cap. There are four elements to the landfill's surface water control design. The elements are



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collection ditches, discharge (down chute) ditches, a perimeter ditch and detention basins. Twenty-two collection ditches of varying lengths are installed totaling some 15,030 linear feet. The design called for a ditch at each fifteen foot drop in elevation as measured from the high to the low areas of the cap. The collection ditches generally followed the cap contours but are sloped to provide positive drainage. They are grass-lined but for the last twenty-five feet prior to discharging into the discharge ditches where they are stone-lined.

The collection ditches empty into discharge down chute ditches that run perpendicular to the cap contours. There are six discharge ditches, totaling some 3,015 linear feet, spread out fairly evenly throughout the cap area. The discharge ditches drain to the perimeter ditch, which surrounds the entire cap and is some 7,500 linear feet long. Both the discharge and perimeter ditches are stone-lined.

The perimeter ditch discharges to one of the four detention basins located at low points on the landfill property. Thus, rain that discharges off the cap goes through a detention basin if it leaves the site as surface water. The basins are all grass-lined.

In addition to the ditches and basins, there are appurtenant features such as drainage vaults, culverts/headwalls and manholes. There are three drainage vaults, one each for the three locations where drainage layer piping daylights at the gabion wall. They allow the elevation drop from the drainage layer to the perimeter ditch. There are eleven culverts totaling some 750 feet, each with headwall(s) as needed. The culvert diameters range from twelve to thirty-six inches. One run of thirty-six inch diameter culvert has a manhole at each end. There are two other manholes, one to allow the elevation drop from one cap drainage down chute into the perimeter ditch and the other to allow the elevation drop from the perimeter ditch into a drainage basin.

### Site Roads

There are two main roads on the site. The first is the access road that goes from Parker Road into the site about 1,000 linear feet. It then splits in two directions to become the perimeter road. The perimeter road forms a loop of about 7,500 linear feet around the outside (off cap) of the landfill. The access road is paved with asphalt on top of a densely graded aggregate base from Parker Road up to the split. The perimeter road is densely graded aggregate except for the 400 feet leading up to the treatment facility from the split, which also is paved. In addition, the facility's driveways and parking lot have asphalt surfacing on top of densely graded aggregate.

Rainfall is conveyed off the access road into either of two ditches that abut its edge. These ditches drain to a basin before the water exits off site into drainage features along Parker Road. Rainfall is conveyed off the perimeter road either into the perimeter ditch or down the outboard slope of the road into vegetated areas surrounding the landfill.

### Gas Vents

There are sixty-five passive gas vents installed on the cap into the refuse.<sup>11</sup> On average each vent extends some twenty-one feet into the refuse. The gas vents are constructed of a

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<sup>11</sup> When the project was bid, the vents were to be connected to a vacuum system and flare. In 1994 gas testing was performed, and it was determined that passive gas venting was appropriate. Consequently, the vacuum system and flare were not built.



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combination of four inch and six inch diameter PVC screen connected via telescoping joints and contained within a twenty-four inch borehole with a gravel pack. The riser is four inch diameter PVC that extends from the bottom of the soil barrier layer some four feet above finish grade. A gooseneck fitting with a screened opening is attached to the above-ground portion of the riser.

### Monitoring Wells and Piezometers

During the project certain pre-existing wells on and close by the site were modified and certain ones were abandoned. Of the thirty-nine existing wells, thirty were abandoned, three were modified and six were untouched. An additional seventeen monitoring wells and twenty-eight piezometers were installed. Nine bedrock wells in clusters consisting of three wells each were also installed down gradient and some distance from the site.

### Fencing

The CFSL fence is some 8,641 feet long. Enclosed inside the fence line are the cap and associated features as well as the treatment facility. The fence is eight feet high and is topped with three stranded barbed wire that adds another eighteen inches to the height of the fence. Several vehicular and personnel gates are also installed. The main gate is across the access road.

### Ground Water Collection

The ground water collection system consists of nineteen extraction wells, two force main loops, concrete vaults housing the well heads and instrumentation, and local control panels. The extraction wells are installed around the landfill (off of the cap) in the water bearing zones of the unconsolidated aquifer. They are constructed of six inch diameter stainless steel and are screened in the water-bearing zone. Each well contains an appropriately sized submersible pump that introduces ground water into the force main to which it is connected. In general, the wells are some twenty-five feet from their respective force main.

There are two ground water force mains, both of which are constructed of high density polyethylene (HDPE) pipe. The first force main, known as Loop 1, is the larger of the two force mains and is approximately 4,150 linear feet long. It connects the fourteen ground water recovery wells along the southern, eastern, and western boundaries of the site. These wells are designated as GWRW A through N. The second force main, known as Loop 2, is approximately 2,410 linear feet long and connects the five recovery wells along the northern site boundary. These wells are designated as GWRW O through S. The two loops come together outside the treatment facility and discharge at the head of the plant into the Equalization Tank (Tank T-101). This combined run is some 280 linear feet long. The force mains are equipped with a total of five air release valves at high points in the lines and two drain valves at low points.

Each recovery well is housed in a concrete vault. The vault allows ready access to the submersible pump, the stainless steel piping from the pump through the vault wall, and the well instruments and appurtenances. The well instruments and appurtenances include a flow sensor, a water level indicator, an air/vacuum relief valve, a sample tap, a check valve, and an isolation valve. At each well location, the pump and instruments are powered from a control panel mounted to the top of the concrete vault. These panels are stainless steel, weatherproof and resistant to damage from firearms. Each panel contains a flow totalizer, a level transmitter, an



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elapsed time meter, a time delay relay limiting the number of pump starts per hour, an electrical disconnect switch, and a 110 volt electrical outlet. Control of each well is accomplished locally at the panel.

### Ground Water Treatment Facility

The treatment facility is located outside the capped area in the eastern region of the site. It consists of various unit operations housed in the Process Equipment Building (PEB), the Gas Extraction Building (GEB), and the tank farm. The bulk of the process equipment is located in the PEB, which also contains a laboratory and offices. The GEB is primarily used for chemical and spare part storage, although it was originally intended to house landfill gas equipment prior to the elimination of the flare. The tank farm contains four welded steel storage tanks with a catwalk system.

The treatment train starts with ground water equalization. This is followed by metals removal. The metals removal effluent undergoes biological treatment in sequencing batch reactors. After the water undergoes biological treatment it goes through a sand filter and then through a granular activated carbon (GAC) unit for polishing and subsequent discharge. The treatment facility has process instruments and automation controls.

The treatment facility is hydraulically connected to the landfill by the ground water force main. The force main discharges to the ground water equalization tank, T-101, which is a 100,000 gallon above grade, open top steel tank. Its purpose is to provide short-term storage and to dampen the effects on downstream processes resulting from variations in loading and flow. The tank was sized in order to hold over 12 hours of flow at the design flow rate of 175,000 gallons per day. Tank T-101 is equipped with a submersible aerator to provide aeration and mixing of suspended solids and sodium hydroxide as well as to prevent septicity of the waste stream. Sodium hydroxide is added to increase the pH of the ground water for the metals removal process. The sodium hydroxide is delivered from the sodium hydroxide storage tank, T-103, located in the GEB.

The ground water equalization tank effluent is pumped by one of two equalization pumps to the metals removal system, M-101. The metals removal system utilizes chemical co-precipitation and gravity clarification processes with a lamella gravity settler/thickener. The system consists of a rapid mix tank, a flocculation tank, an inclined plate settler, and an integral sludge thickener hopper and sludge rake mechanism. Various chemicals may be added to the unit at the operator's discretion, including ferric sulfate, process polymer, powdered activated carbon, sugar, phosphoric acid, and sulfuric acid. Sulfuric acid is used to decrease the pH to a neutral range prior to transfer to the biological treatment system.

The biological treatment system consists of two sequencing batch reactors (SBR's). The SBR system is a batch biological treatment system designed primarily for treatment of organic chemicals and ammonia nitrogen ( $\text{NH}_3\text{-N}$ ). The process involves timed cycles for mixing, aerating, settling, and decanting. The system consists of two identical, above grade, open top steel tanks with a capacity of 300,000 gallons each. The tanks are identified as SBR # 1 and SBR # 2 or Q-101 A/B, respectively, and contain four compartments referred to as the influent



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holding tank, reactor tank, decant holding tank, and sludge holding tank. Aeration of the compartments is provided by a diffused air blower system.

Effluent from the SBR's is pumped to the continuous upflow sand filters, SF-101 A/B, for filtration. Filtration provides for removal of suspended solids to assure compliance with effluent limitations. It also helps to prolong the life of the downstream carbon adsorption beds. Filtered effluent flows by gravity to the 1,000 gallon filtrate holding tank, T-104.

Water from the filtrate holding tank is pumped to the carbon adsorption units, C-101 A/B, for the removal of trace organics. Each unit contains 20,000 pounds of granular activated carbon. Filtrate from these units is collected and stored in the 22,000 gallon carbon backwash tank, T-110, where it is generally discharged by gravity to the plant outfall but can be used for carbon backwashing, plant housekeeping, or chemical batching.

The sludge that is generated during metals removal and biological treatment is combined in the sludge conditioning tank, T-106. Dewatering is accomplished via a plate and frame filter press, F-101. The dewatered sludge cake is deposited into a roll-off container for off-site disposal.

The plant's integrated instruments and controls assist in keeping operations within permit limits. Automation allows the plant to run with minimal operator intervention, such as in unattended mode during off-hours, e.g. at night and on weekends. The treatment process is equipped with three programmable logic controllers (PLC's): the main PLC, which controls most of the process; the SBR PLC, which controls the SBR system and communicates with the main PLC; and the filter press PLC, which controls the filter press and provides some information to the main PLC.

The ground water treatment system is a closed loop system. Process overflows, in-plant drainage, and recycle streams are collected by a series of pipelines that direct the flow to a plant drainage pump station. The pump station then returns the waters to the ground water equalization tank for treatment.

### Operational and Functional Plant Operations

According to the construction contract, FWEI was required to operate and maintain the treatment facilities, as well as the entire site, for a period of one year commencing on the date of Substantial Completion. This interval is known as the operational and functional (O & F) period. At the conclusion of the O & F period and at the State's discretion, FWEI could have continued this work on a month-to-month basis for up to one year.

As previously discussed, FWEI did not achieve Substantial Completion, and the State was required to undertake the completion of the project. It was determined that OBG and its affiliate, OBG Ops, could best complete the remaining work without significant additional delay to the project. Ultimately, OBG declared the project to be substantially complete on September 20, 1997, and the O & F period commenced thereafter on September 23, 1997 under the direction of OBG Ops. OBG Ops concluded this work on September 22, 1998.

During the O & F period, a crew of three persons typically manned the plant during the day, five days per week. In the event of an alarm from the plant autodialer or the plant security system, the crewmember on call provided after-hours coverage on an as-needed basis. A project





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manager from OBG Ops supervised the crew, which consisted of a New Jersey licensed N-4 operator, a New Jersey licensed N-2 operator, and a technician. The scope of services included, but was not limited to, the following:

- Operation and maintenance of the ground water extraction system consisting of nineteen recovery wells and their associated controls and the ground water force main;
- Operation and maintenance of the treatment systems consisting of metals removal, biological treatment, filtration, carbon adsorption, sludge conditioning and dewatering;
- Analytical testing, both in-house in the on-site laboratory and by off-site certified laboratories;
- Transportation and recycling or disposal, as appropriate, of spent activated carbon and dewatered sludge <sup>12</sup>;
- Record keeping and reporting as required to comply with NJPDES permit equivalent and the water allocation permit issued for the site or as required by the contract;
- Operation and maintenance of the pre-engineered buildings; and
- Grounds maintenance of the landfill cap and the surrounding property.

Over the one year O & F period, a total of 31.6 million gallons of treated water was discharged to the headwaters of the East Branch of Trout Brook. With only a few exceptions, the treated water complied with the limits established in the discharge permit equivalent issued by the State. All incidents of non-compliance were appropriately documented and explained by OBG Ops.

### Drum Removal and Disposal

During implementation of the landfill closure, 151 drums were removed from the ground. Of this number, nine were returned to the landfill because they were empty. Of the remaining 142 drums, five drums were packaged laboratory chemicals (lab packs). These five lab packs became seven drums of solidified waste after on-site processing for disposal. Thus, there were 144 drums for off-site disposal. Clean Harbors, Inc. disposed of the 144 drums in March 2000.<sup>13</sup> Cost recovery evidence from the drums was provided to the State's Division of Law.

As-built construction drawings are on file at the site treatment facility and at the Trenton offices of the NJDEP.

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<sup>12</sup> Approximately 20,000 pounds of spent carbon was transported off site for recycling at Calgon Corporation's Neville Island facility in Pennsylvania. Additionally, approximately 56 tons of nonhazardous dewatered sludge was transported off site for disposal at BFI Conestoga Landfill in Morgantown, Pennsylvania.

<sup>13</sup> Clean Harbors was engaged pursuant to an open competitive solicitation and performed under Contract No. A82285.



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## VI. Budget and Cost

### A. FOSTER WHEELER ENVIRESPONSE, INC.

#### 1. General Overview

The following is a summary of the base contract, negotiated change orders, and retainage for FWEI's construction contract, A52766.

Base contract amount.....	\$26,106,780.38
Total negotiated change orders .....	<u>\$1,835,976.00</u>
Base contract and negotiated change orders subtotal .....	\$27,942,756.38
Base contract net payments.....	\$20,955,355.84
Negotiated change order net payments .....	<u>\$1,486,898.41</u>
Net payments subtotal.....	\$22,442,254.25
Base contract retainage withheld .....	\$1,300,839.02
Negotiated change order retainage withheld.....	<u>\$148,689.84</u>
Retainage subtotal.....	\$1,449,526.86
Claims settlement.....	\$15,000,000.00
Total cost.....	\$38,891,783.11

Prior to the settlement of the lawsuit between FWEI and the NJDEP, FWEI asserted a demand of over \$62 million. This amount included unexpended base contract line item quantities, base contract and change order retainage, disputed change orders, and assorted claims. These items were addressed as part of the lawsuit settlement and are discussed later in this section.

#### 2. Base Contract Line Item Summary

The construction contract included 62 line items and associated sub-items that were the basis of FWEI's bid for \$26,016,780.38. Because the contract was a unit price contract, FWEI was paid for the actual number of units completed. The table below summarizes the contract bid schedule and the amounts paid for each line item.

ITEM	ITEM NAME	BID QUANTITY	BID PRICE	BID TOTAL	AMOUNT PAID
1	Performance & payment bonds	1 LS	\$190,000.00	\$190,000.00	\$190,000.00
2	Mobilization/demobilization	1 LS	\$722,644.77	\$722,644.77	\$650,380.29
3	O & M Temporary Facilities	1 LS	\$414,156.23	\$414,156.23	\$414,156.23
4	Cash Allowance Telephone, Electric, & Gas	1 LS	\$70,000.00	\$70,000.00	\$5,487.43



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<u>ITEM</u>	<u>ITEM NAME</u>	<u>BID QUANTITY</u>	<u>BID PRICE</u>	<u>BID TOTAL</u>	<u>AMOUNT PAID</u>
5	On-site Geotechnical Lab.	1 LS	\$156,887.61	\$156,887.61	\$156,887.61
6	Clearing & Grubbing	1 LS	\$88,212.00	\$88,212.00	\$88,212.00
7	Water Management & Disposal	1 LS	\$189,005.61	\$189,005.61	\$189,005.61
8	Earthwork-Fill/Refuse Relocation	200,000 CY	\$2.06	\$412,000.00	\$411,307.00
9	Off-site Embankment Material	130,000 CY	\$10.67	\$1,387,100.00	\$1,386,314.00
10	Barrier Layer Test Section	1 LS	\$42,344.49	\$42,344.49	\$42,344.49
11	Soil Barrier Layer	201,476 CY	\$19.85	\$3,999,298.60	\$3,924,094.70
12	Flexible Membrane Cover	1,140,025 SF	\$0.29	\$330,607.25	\$329,012.26
13	Geotextile Filter	4,510,800 SF	\$0.16	\$721,728.00	\$659,479.31
14	Drainage Layer	100,738 CY	\$17.20	\$1,732,693.60	\$1,700,110.60
15	Vegetative Layer	151,107 CY	\$11.79	\$1,781,551.53	\$1,748,050.49
16	Side Slope Diversion Ditches	13,760 LF	\$31.05	\$427,248.00	\$263,614.50
17	Cap Drainage Ditches	3,638 LF	\$38.20	\$138,971.60	\$109,825.00
18	Topsoil	50,379 CY	\$18.13	\$913,371.27	\$896,017.23
19	Seeding	63 AC	\$2,592.75	\$163,343.25	\$127,736.34
20	Gabion Wall	4,850 CY	\$62.15	\$301,427.50	\$287,601.25
21A	Perforated PVC Pipe	14,160 LF	\$6.77	\$95,863.20	\$86,108.66
21B	Solid PVC Pipe	680 LF	\$10.63	\$7,228.40	\$6,213.67
22	Cap Drainage Vaults	3 EA	\$3,384.66	\$10,153.98	\$10,153.98
23A	Grading 24' Access Road	1,586 LF	\$11.02	\$17,477.72	\$16,232.46
23B	Grading 12' Perimeter Road	7,000 LF	\$8.88	\$62,160.00	\$62,160.00
23C	Grading 18' Driveway & Parking	1,295 SY	\$3.16	\$4,092.20	\$4,078.68
24	Perimeter Road Aggregate	3,300 CY	\$24.03	\$79,299.00	\$74,995.23
25	Paved Road Subbase	2,350 CY	\$23.36	\$54,896.00	\$37,999.71
26A	Bituminous Paving I-1	270 CY	\$51.65	\$13,945.50	\$13,945.50
26B	Bituminous Paving I-4	135 CY	\$56.59	\$7,639.65	\$7,639.65
26C	Bituminous Paving I-3	135 CY	\$58.34	\$7,875.90	\$7,875.90
27	Temporary Repairs Parker Road	1,000 SY	\$11.34	\$11,340.00	\$0.00
28	Permanent Repairs Parker Road	5,000 SY	\$10.93	\$54,650.00	\$0.00
29	Gas Well 30' Deep	66 EA	\$2,777.86	\$183,338.76	\$180,560.90
30	Gas Well Add/Deduct	600 VLF	\$92.00	\$55,200.00	\$6,164.00
31A	Gas Header Below Grade 4"	5,410 LF	\$14.08	\$76,172.80	\$3,808.64
31B	Gas Header Below Grade 6"	2,975 LF	\$20.23	\$60,184.25	\$3,009.21
31C	Gas Header Below Grade 8"	7,135 LF	\$15.10	\$107,738.50	\$5,386.93
31D	Above Grade FRP Gas Pipe 4"	2,665 LF	\$36.03	\$96,019.95	\$4,801.00
31E	Above Grade FRP Gas Pipe 6"	1,365 LF	\$47.88	\$65,356.20	\$3,267.81
31F	Above Grade FRP Gas Pipe 8"	550 LF	\$55.82	\$30,701.00	\$1,535.05
31G	Gas System Header Accessories	1 LS	\$73,900.54	\$73,900.54	\$3,695.03



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ITEM	ITEM NAME	BID QUANTITY	BID PRICE	BID TOTAL	AMOUNT PAID
32	Condensate Collection System	1 LS	\$217,838.49	\$217,838.49	\$10,787.37
33	Gas Treatment System	1 LS	\$1,302,037.34	\$1,302,037.34	\$631,940.58
34A	Reinforced Concrete Pipe 12"	100 LF	\$30.90	\$3,090.00	\$2,950.95
34B	Reinforced Concrete Pipe 15"	215 LF	\$26.53	\$5,703.95	\$5,703.95
34C	Reinforced Concrete Pipe 18"	55 LF	\$46.55	\$2,560.25	\$1,862.00
34D	Reinforced Concrete Pipe 21"	105 LF	\$35.30	\$3,706.50	\$3,706.50
34E	Reinforced Concrete Pipe 24"	50 LF	\$45.82	\$2,291.00	\$0.00
34F	Reinforced Concrete Pipe 30"	25 LF	\$74.18	\$1,854.50	\$1,854.50
34G	Reinforced Concrete Pipe 36"	248 LF	\$70.94	\$17,593.12	\$17,593.12
35	Reinforced Concrete Headwalls	16 EA	\$4,274.05	\$68,384.80	\$55,562.65
36A	Storm Manhole 5' Diameter	3 EA	\$7,686.05	\$23,058.15	\$23,058.15
36B	Cap Drainage Manholes 5' Diameter	1 EA	\$7,351.36	\$7,351.36	\$7,351.36
37A	Riprap Lighter than 100 lb	5,900 CY	\$26.12	\$154,108.00	\$84,317.29
37B	Riprap Heavier than 100 lb	2,300 CY	\$38.02	\$87,446.00	\$74,824.50
37C	Gabion Mattresses	100 CY	\$52.59	\$5,259.00	\$3,108.60
37D	Riprap Bedding	4,200 CY	\$27.47	\$115,374.00	\$66,791.34
38A	Select Fill Type A	1,000 CY	\$33.11	\$33,110.00	\$0.00
38B	Select Fill Type B	800 CY	\$31.30	\$25,040.00	\$0.00
38C	Select Fill Type C	500 CY	\$27.16	\$13,580.00	\$0.00
38D	Select Fill Type D	1,900 CY	\$25.58	\$48,602.00	\$0.00
38E	Select Fill Type E	200 CY	\$25.83	\$5,166.00	\$0.00
38F	Select Fill Type F	1,200 CY	\$32.94	\$39,528.00	\$129.63
38G	Select Fill Type G	200 CY	\$25.60	\$5,120.00	\$0.00
38H	Select Fill Type H	400 CY	\$28.81	\$11,524.00	\$0.00
38I	Select Fill Type I	100 CY	\$52.17	\$5,217.00	\$0.00
39	Concrete	50 CY	\$184.14	\$9,207.00	\$1,841.40
40	Detention Basins	1 LS	\$75,254.06	\$75,254.06	\$52,677.84
41	Groundwater Recovery Well 40' Deep	19 EA	\$4,221.37	\$80,206.03	\$80,206.03
42	Recovery Well Add/Deduct	150 VLF	\$105.53	\$15,829.50	\$2,585.49
43	Groundwater Collection System	1 LS	\$655,051.00	\$655,051.00	\$448,580.02
44	Groundwater Treatment System	1 LS	\$3,584,661.44	\$3,584,661.44	\$3,347,141.04
45A	PVC Monitoring Well 2" Diameter 40' Deep	18 EA	\$2,197.27	\$39,550.86	\$35,156.32
45B	PVC Monitoring Well 4" Diameter 35' Deep	11 EA	\$2,246.02	\$24,706.22	\$24,706.22
45C	PVC Monitoring Well 6"	9 EA	\$5,357.90	\$48,221.10	\$48,221.10



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<u>ITEM</u>	<u>ITEM NAME</u>	<u>BID QUANTITY</u>	<u>BID PRICE</u>	<u>BID TOTAL</u>	<u>AMOUNT PAID</u>
	Diameter 70' Deep				
45D	Steel Monitoring Well 6" Diameter 75' Deep	6 EA	\$4,546.12	\$27,276.72	\$27,276.72
45E	Offsite Monitoring Well 100' Deep	3 EA	\$10,553.45	\$31,660.35	\$31,660.35
45F	Offsite Monitoring Well 150' Deep	3 EA	\$13,800.83	\$41,402.49	\$41,402.49
45G	Offsite Monitoring Well 200' Deep	3 EA	\$17,118.31	\$51,354.93	\$51,354.93
46A	PVC Monitoring Well 2" Add/Deduct	150 VLF	\$54.94	\$8,241.00	\$6,867.50
46B	PVC Monitoring Well 4" Add/Deduct	100 VLF	\$63.86	\$6,386.00	\$255.44
46C	PVC Monitoring Well 6" Add/Deduct	150 VLF	\$76.58	\$11,487.00	(\$4,747.96)
46D	Steel Monitoring Well 6" Add/Deduct	100 VLF	\$60.61	\$6,061.00	\$2,121.35
46E	Offsite Monitoring Well Add/Deduct	250 VLF	\$106.08	\$26,520.00	\$25,777.44
47A	Grouting Existing Monitoring Well	1,500 VLF	\$12.99	\$19,485.00	\$14,555.30
47B	Borehole Abandonment	500 VLF	\$12.99	\$6,495.00	\$0.00
48	Erosion & Sediment Control	1 LS	\$154,076.22	\$154,076.22	\$142,933.73
49A	Chain Link Fence	8,900 LF	\$14.27	\$127,003.00	\$122,807.07
49B	Fence Grounding	1 LS	\$10,824.13	\$10,824.13	\$10,824.13
50	Decontamination Facilities	1 LS	\$288,315.87	\$288,315.87	\$288,315.87
51A	Air Monitoring Plan	1 LS	\$283,329.21	\$283,329.21	\$283,329.21
51B	Additional Tube Testing	100 EA	\$644.03	\$64,403.00	\$2,576.12
52	Dust Control Plan	1 LS	\$32,652.57	\$32,652.57	\$32,100.27
53	Environmental Pollution Control Plan	1 LS	\$24,510.29	\$24,510.29	\$24,510.29
54	Spill & Discharge Control Plan	1 LS	\$49,459.54	\$49,459.54	\$49,459.54
55	Quality Control Plan	1 LS	\$130,955.95	\$130,955.95	\$130,955.95
56	Security Plan	1 LS	\$104,929.13	\$104,929.13	\$104,929.13
57	Health & Safety Plan	1 LS	\$261,642.53	\$261,642.53	\$261,642.53
58	Drum Removal	100 EA	\$977.44	\$97,744.00	\$96,766.56
59	Test Pit	25 EA	\$310.30	\$7,757.50	\$7,757.50
60	Erosion Control Matting	11,000 SY	\$7.58	\$83,380.00	\$47,998.08
61	Operation & Maintenance 1st Year	1 LS	\$982,186.22	\$982,186.22	\$0.00
62	Operation & Maintenance 2nd Year	12 MO	\$81,848.85	\$982,186.20	\$0.00
<b>Base Contract Total</b>				<b>\$26,016,780.38</b>	<b>\$20,955,355.84</b>



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### 3. Change Orders Overview

During the course of FWEI's project work it was issued sixty-nine change orders. Of these, twenty-four were negotiated between FWEI and NJDEP, i.e. resulted in the processing of the State's Contract Modification Proposal and Acceptance Form (DWM-042). These twenty-four Change Orders totaled \$1,835,976.00. Of this amount \$1,402,903.34 was in the form of Extra Work and \$433,072.66 was in the form of Supplemental Work.

There never were price agreements or time extension agreements reached with FWEI on the other forty-five change orders.<sup>14</sup> These change orders were disputed. Generally, the work under these change orders proceeded on a Cost of the Work (COTW) basis. However, because FWEI disputed many of the COTW payment provisions of the contract, did not submit appropriate documentation of its asserted costs, and refused to apply for partial payment on undisputed cost elements, FWEI didn't receive any payment for these change orders through normal contract billing procedures. Resolution of the disputed change orders was part of the CFSL litigation settlement. A description of FWEI change orders and the related FWEI assigned Change Notice (CN) numbers follows. The negotiated change orders are first and are listed sequentially by change order number. The disputed change orders are second and are listed sequentially by CN number.

### 4. Negotiated Change Orders

The twenty-four negotiated change orders, totaling \$1,835,976.00, are listed below. A brief description of each follows.

1. Notice of Award (CO 93-010RA-10) .....	\$0.00
2. Tower Grounding I (CO 94-010RA-11) .....	\$7,831.55
3. Parker Road Drainage (CO 94-010RA-12) .....	\$26,573.31
4. Tower Grounding II (CO 94-010RA-13) .....	\$4,172.23
5. Gabion Filter Fabric (CO 94-010RA-14) .....	\$1,656.00
6. Additional Excavation I (CO 94-010RA-15) .....	\$472,225.00
7. Test Pits (CO 94-010RA-16) .....	\$7,757.50
8. Permanent Road Partial Deletion (CO 94-010RA-17) .....	\$408.82
9. Additional Excavation II (CO 95-010RA-18) .....	\$654,725.00
10. Air Monitoring (CO 95-010RA-19) .....	\$3,081.49
11. Assorted T&M Work (CO 94-010RA-20) .....	\$10,947.96
12. Perimeter Road Elevation (CO 95-010RA-21) .....	\$2,397.00
13. Drums I (CO 95-010RA-22) .....	\$19,548.80
14. Mark-ups (CO 95-010RA-23) .....	\$383.86

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<sup>14</sup> There are limited instances where NJDEP issued several closely related work directives that for the purposes of this report are considered 1 change order.



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15. PVC Conduit Credit (CO 95-010RA-24) .....	(\$7,603.00)
16. DCA Modifications I (CO 95-010RA-25).....	\$13,000.00
17. Cap Extensions and Drainage (CO 95-010RA-26) .....	\$166,090.98
18. Embankment Unit Price Escalation (CO 95-010RA-27) .....	\$313,500.00
19. DCA Modifications II and Process Modifications (CO 96-010RA-28) .....	\$57,882.00
20. Cap Surface Water Controls (CO 96-010RA-29).....	\$29,497.50
21. Light Switch Relocations & Pipe Material Change (CO 96-010RA-30) .....	\$920.00
22. Grounding Conductor (CO 96-010RA-31).....	\$127.00
23. Pipe Material Changes (CO 96-010RA-32) .....	\$1,981.00
24. Drums II (CO 96-010RA-33) .....	\$48,872.00

Notice of Award (CO 93-010RA-10) <sup>15</sup>

This was a no cost 7-day contract time extension to resolve a dispute regarding the timing and manner of NJDEP notification to FWEI that it was awarded the contract. (CN 1)

Tower Grounding I (CO 94-010RA-11)

This was for \$7,831.55 and no time to ground three high voltage electrical transmission towers. This was done because excavation activities may have rendered prior grounding useless. FWEI was paid the full change order amount. (CN 6)

Parker Road Drainage (CO 94-010RA-12)

This was for \$26,573.31 and no time to install certain drainage improvements at and along part of the intersection of the site access road and Parker Road. These were contract upgrades desired by Chester Township and consented to by the NJDEP. FWEI was paid the full change order amount. (CN 8)

Tower Grounding II (CO 94-010RA-13)

This was for \$4,172.23 and no time to ground one other on-site electrical tower. FWEI was paid the full change order amount. (CN 6)

Gabion Filter Fabric (CO 94-010RA-14)

This was for \$1,656.00 and no time to provide a small quantity of filter fabric for the gabion wall in limited areas to ensure no soil migration would undermine the wall after installation. FWEI was paid the full change order amount. (CN 31)

Additional Excavation I (CO 94-010RA-15)

This was for \$472,225.00 and no time to extend the line items for on-site excavation (Pay Item 8) and embankment material importation and installation (Pay Item 9). The additional excavation quantity was needed due to a greater than anticipated depth of refuse surrounding the

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<sup>15</sup> The designation 93-010RA-10 is described as follows: "93" is the State fiscal year 1993; "010RA" identifies the CFSL project Remedial Action phase; "10" is the next sequential number of change order for all CFSL phases (Remedial Investigation/Feasibility Study, Remedial Design, RA). The other FWEI change orders were designated in a like manner.



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cap area. The original bid quantity for refuse was based on test pitting performed during the design. The additional embankment quantity was needed to backfill the deeper than expected refuse excavations. FWEI was paid \$429,323.44 for this change order. (CN 26)

Test Pits (CO 94-010RA-16)

This was for \$7,757.50 and no time to increase the line item quantity for test pits (Pay Item 59) by twenty-five. This was needed to help quantify the amount of additional refuse surrounding the cap. FWEI was paid the full change order amount. (CN 23)

Permanent Road Partial Deletion (CO 94-010RA-17)

This was for \$408.82 and no time to delete some 350 feet of the permanent access road into the site from Parker Road. This was done because the first 350 feet of the constructed temporary access road was suitable to be used as a permanent feature. The change order reimbursed FWEI for its permitting costs relative to the permanent access road. It also included a provision stating that the unit prices and quantities appropriated for the permanent access road will be allocated for any future adjustments that may be required of the temporary access road. A dispute arose regarding payment to FWEI for converting the temporary access road. FWEI was paid the full change order amount. (CNs 12, 27)

Additional Excavation II (CO 95-010RA-18)

This was for \$654,725.00 and no time to extend the line items for on-site excavation (Pay Item 8) and embankment material importation and installation (Pay Item 9). This was a follow up to change order 94-010RA-15. This change order was needed due to OBG refining its quantity estimates of refuse surrounding the cap and of available on-site embankment. Additionally, OBG had to correct for not previously accounting for compaction in determining the contract quantity of "loose" off-site embankment needed between the refuse and clay layer. FWEI was paid \$580,892.08 for this change order. (CN 42)

Air Monitoring (CO 95-010RA-19)

This was for \$3,081.49 and no time for perimeter air monitoring directed by NJDEP during a suspension of invasive site work. FWEI was paid the full change order amount. (CN 14)

Assorted T&M Work (CO 94-010RA-20)

This was for \$10,947.96 and no time for certain work performed by FWEI on a time and material<sup>16</sup> basis. There were three separate elements of work under this change order, as follows. The first element concerned the installation of drainage improvements and signage at and nearby the intersection of the site access road and Parker Road, as required by the Chester Township road opening permit. The negotiated cost for this work was \$8,837.19. The second element was revising several proposed well locations after they were laid out. This was required due to undesirable initial locations and cost \$670.69. The third element was FWEI equipment standby time incurred at NJDEP's direction during drum removal operations in November 1993. The standby cost was \$1,440.08. FWEI was paid the full change order amount. (CNs 8, 21, 28)

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<sup>16</sup> Time and material work is termed Cost of the Work under the provisions of the FWEI-NJDEP contract.





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Perimeter Road Elevation (CO 95-010RA-21)

This was for \$2,397.00 and no time for resurveying the site perimeter road profile after it was already laid out. The work resulted when the perimeter road elevation was lowered so that less off-site embankment would be needed. It was estimated that approximately \$25,000 in off-site embankment was saved. FWEI was paid the full change order amount. (CN 25)

Drums I (CO 95-010RA-22)

This was for \$19,548.80 and no time to increase the line item quantity for drum removal (Pay Item 58) by twenty units from 100 to 120. This was needed because the quantity of drums encountered was expected to exceed the quantity provided for by contract. FWEI was paid the full change order amount. (CN 54)

Mark-ups (CO 95-010RA-23)

This was for \$383.86 and no time to refine the terms of the contractual markups allowed under the Cost of the Work (COTW) provisions of the contract for the prime and lower tier contractors. FWEI was paid \$383.86 as a payment adjustment to CO 94-010RA-20 in order to reflect the refined COTW mark-up terms. (CN 30)

PVC Conduit (CO 95-010RA-24)

This was for a credit of \$7,603.00 and no time to reimburse NJDEP for FWEI's unauthorized underground use of PVC conduit in lieu of specified steel conduit. (CN 50)

DCA Modifications I (CO 95-010RA-25)

This was for \$13,000.00 and no time to (1) tether the Gas Extraction Building (GEB) explosion relief panels to the main members of the GEB structural steel (\$12,000); and (2) make minor plumbing changes concerning sanitary piping and backflow preventer air gap (\$1,000.00). Both of these revisions were required as a result of the plan review conducted by the Department of Community Affairs (DCA). FWEI was paid the full change order amount. (CNs 39, 41)

Cap Extensions and Drainage (CO 95-010RA-26)

This was for \$166,090.98 and no time for two cap extensions and the provision of additional drainage layer piping and liner in the cap's low lying electrical transmission right-of-way (ROW) area. One cap extension was about one third of an acre and was made to cap an unanticipated fill area uncovered during grading operations. The other extension was about two thirds of an acre and was made to cap the area of Detention Basin D because the excessive depth of refuse there made capping more cost effective than removal as originally planned. Lastly, the liner and drainage layer piping were added to reduce any likelihood of slope failure above the low-lying electrical transmission ROW. FWEI was paid \$155,739.69 for this change order. (CNs 33, 46, 53)

Embankment Unit Price Escalation (CO 95-010RA-27)

This was for \$313,500.00 and no time to settle three claims associated with CO's 94-010RA-15 and 95-010RA-18. This change order provided FWEI an increase of \$3.30 per cubic yard over the base contract unit price of \$10.67 for embankment (Pay Item 9). This added cost was applied



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to the additional 95,000 cubic yards of embankment authorized under CO's 94-010RA-15 and 95-010RA-18. FWEI was paid \$303,407.35 for this change order. (CNs 24, 26, 42)

DCA Modifications II and Process Modifications (CO 96-010RA-28)

This was for \$57,882.00 and no time for various treatment facility changes. The first four items described below were required as a result of the Department of Community Affairs (DCA) plan review of the treatment facility. The other two items were equipment related and resulted from FWEI inquiries to OBG. The DCA modifications were multifaceted. The first part, with a cost of \$19,267.00, was primarily for the installation of a lightweight metal deck and handrail system in the PEB. In addition, there was a PEB stair tread change and the identification of a handrail height in the GEB. The second part, with a cost of \$5,815.00, provided for an additional exit sign and discharge light in the GEB and a larger wire gauge for 2 PEB circuits. The third part, with a cost of \$14,500.00, provided a fire rating upgrade in the GEB. This included raising a block wall to the ceiling, adding reinforcement, and grouting the wall. Fire stopping and closing off a chase opening were also included. The fourth part was a no-cost change memorializing the diameter of lighting conduit on the catwalk and identifying the ground wire gauge for the PEB transformer. The fifth part, with a cost of \$3,000.00, altered the filter press access footing and platform to eliminate interference between the platform and certain PEB structural members. The sixth and last part, with a cost of \$15,300.00, changed the make and model numbers for two dustless debaggers (one each in the PEB and GEB) and also involved support platform and electrical circuitry changes. This was needed because the specified debaggers were too tall for their respective locations. During the procurement cycle for the debaggers, FWEI encountered problems getting the newly specified vendor to provide the debagger for the GEB. This resulted in a dispute with FWEI, and ultimately the NJDEP advised FWEI that it would be compensated for its efforts to resolve this matter. FWEI was paid the full change order amount. (CNs 13, 37, 38, 40, 43, 66, 76, 140)

Cap Surface Water Controls (CO 96-010RA-29)

This was for \$29,497.50 and no time to add 950 linear feet of cap side slope diversion (CSSD) ditch and to change the majority of the CSSD ditches from stone lined to grass lined. The additional CSSD ditch footage was required to accommodate the changes in final cap topography that resulted from the excess refuse administered under change orders 94-010RA-15, 95-010RA-18, and 95-010RA-27. The change in ditch lining was contemplated in the bid and was considered by OBG to be an improvement from constructability, maintenance, and cost perspectives. FWEI was paid \$21,894.50 for this change order. (CN 79)

Light Switch Relocations and Pipe Material Change (CO 96-010RA-30)

This was for \$920.00 and no time to relocate three light switches to the knob side of the doors, as required by standard practice, and to substitute nalgene tubing for PVC pipe for three chemical lines in the containment pipe. The change to tubing provided flexibility to overcome potential installation problems. FWEI was paid \$686.67 for this change order. (CNs 112, 114)



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Grounding Conductor (CO 96-010RA-31)

This was for \$127.00 and no time to increase and correct the size of a grounding conductor for power circuit PC-1. FWEI was paid the full change order amount. (CN 111)

Pipe Material Changes (CO 96-010RA-32)

This was for \$1,981.00 and no time to substitute teflon tubing for tygon tubing on the sodium hydroxide chemical feed line. Also, Class I Division I rated heat trace cable was substituted for the standard cable specified. The tubing substitution was made to allow for higher burst temperature and pressure ratings on the line. The heat trace cable change was required because the area in which the pipe was installed was considered a hazardous location. FWEI was paid the full change order amount. (CN 125)

Drums II (CO 96-010RA-33)

This was for \$48,872.00 and no time to increase the line item quantity for drum removal (Pay Item 58) by fifty units from 120 to 170. This was needed because the quantity of drums encountered was expected to exceed the quantity provided for by contract and CO 95-010RA-22. FWEI was paid \$27,368.32 for this change order. (CN 136)

*5. Disputed Change Orders*

The NJDEP directed changes to the work for the following forty-five items and was unable to reach price or time extension agreements with FWEI. Generally, the disputed work proceeded on a Cost of the Work (COTW) basis, and FWEI tracked the work items using change notice (CN) numbers.

Revised Grading Plan

This was a disputed modification under which FWEI was ordered to alter the bid cap grading plan. The modification raised the cap grades in a limited portion of the landfill to accommodate the perimeter refuse that was present to a greater depth than anticipated from design phase test pitting. The excavation of the additional refuse was administered under CO 94-010RA-15 and CO 95-010RA-18. FWEI relinquished any rights to additional monies under this change order per the terms of CO 95-010RA-27. (CN 24)

Additional Panel TPP-1A

This was a disputed COTW change order in which an electrical panelboard and enclosure were added to the PEB. The panelboard was specified as a 30 circuit, 100 amp, 102/208 volt power panel in OBG's Modification 15, Revision 1. The additional panelboard was needed for to power heat trace circuits and some process instruments because the original panel, TPP-1, had inadequate space. (CN 34)

Ground Water Recovery Changes

This was the result of a disputed modification that ended up as a disputed COTW change order. The modification altered recovery well pump sizes (both increases and decreases), reduced pipe diameters for parts of the ground water force main and recovery wells, and changed the recovery well control panel size and electrical features (primarily revised transformers to match the



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revised pumps). The need to revise the well pump schedule was expressly called out in the bid documents since the actual well construction was expected to vary from the design, which was based on limited pump testing. In addition, the conduit diameter on the larger force main loop was increased to conform to National Electrical Code requirements for conduit fill limitation. (CNs 45, 118)

### Recovery Well Redevelopment

This was a disputed COTW change order. The work was to redevelop and perform step testing as directed on up to 8 recovery wells. This was done in order to maximize ground water recovery. (CN 47)

### Landfill Gas Collection and Treatment Deletion

This was a disputed scope of work reduction modification. The elements of work deleted were major and included the network of landfill gas (LFG) collection piping and vacuum exhausters; LFG condensate piping, vaults, pump stations, and holding tank; and the enclosed flare. LFG collection and treatment were deleted because field testing performed by OBG on certain installed gas wells demonstrated that the chemical concentration of the gas did not merit a flare, and significantly less gas volume was expected to be recovered. LFG collection and treatment as bid was based on limited gas testing and literature values considered during the design phase. As part of the evaluation leading to the system deletion, New Jersey air quality regulations and guidelines were evaluated, and it was concluded that state-of-the-art pollution control, such as a flare, was not required. As a result, a permit application for passive venting was applied for and issued. No agreement was ever reached with FWEI as to the value of the credit due for the deleted work.

The scope modification also included the addition of a plant drainage pump station. As bid, drainage from the ground water treatment facility was directed to one of the LFG condensate pump stations located some distance from the facility. When the LFG features were eliminated, it was concluded that the pump station should be relocated to the plant. Consequently, the modification specified that the plant drainage pump station be installed in the tank farm area in front of the GEB. Details for one of the bid pump stations were modified accordingly for the revised application. This plant drainage pump station work was authorized and directed by the NJDEP to proceed as a COTW change order. (CN 52)

### SBR Changes

This was the result of a disputed modification that ended up as a disputed COTW change order. The modification's scope included reducing the sizing of the blowers that aerate the sequencing batch reactors (SBR's), specifying that the SBR blowers be re-spaced and installed on a concrete equipment pad, providing variable frequency drives (VFD's) for certain SBR blowers, and formalizing the reduced loading expected in the SBR influent. Except for the blower re-spacing and equipment pad, the physical changes provided the SBR's with greater operational flexibility and were required because the loading of the ground water was lower than had been expected from the analyses performed during the design phase. The equipment pad was required to counter vibration of the blowers, and increased spacing between the blowers was added to allow for proper operational access and safety considerations. The blower re-spacing was facilitated by



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the relocation of the compressor from the blower room to the filter press room of the PEB, tracked under CN 75. (CN 57)

Water Line Size Reduction

This was a disputed scope of work reduction modification in which FWEI was ordered to reduce the diameter of the incoming potable water service line from ten inches to six inches. There were also appurtenant changes to valves, tees and fittings. The reduction was made because the water line to the facility was sized to serve a fire sprinkler system, but the fire sprinkler system was deleted in the contract addenda; however, the size of the water line was not reduced at that time, leaving the water line oversized. FWEI disputed the amount of the net credit due NJDEP. (CN 58)

Landfill Gas Build-up Under Cap Liner

This was a disputed COTW change order. Landfill gas accumulated under the liner at certain cap locations, causing the liner to bubble, and was released through the installation of temporary vent points. Ultimately, the liner was repaired at the temporary vent locations. After the overlying cap layers were installed, landfill gas build-up ceased. (CN 62)

Tank Farm Pipe Supports

This was a disputed COTW change order. The work was to provide a structural upgrade for eight tank farm pipe supports. The supports were changed from four inch diameter schedule 40 steel pipe to four inch by four inch by ¼ inch thick steel columns. This was needed to ensure adequate support of the piping loads. (CN 73)

Compressor Relocation

This was the result of a disputed modification that ended up as a disputed COTW change order. The work was to relocate the compressor from the PEB blower room to the PEB filter press room. Attendant to this modification were changes to the compressed air distribution piping in the PEB. Per OBG, this modification was needed because the approved compressor was an "or equal" with a larger footprint than expected, and it didn't fit well into the space allotted in the blower room. Moving the compressor out of the blower room allowed for greater spacing between the blowers as discussed under CN 57. (CN 75)

Prime Paint and Surface Preparation Change

This was a disputed COTW change order in which a universal alkyd phenolic primer was substituted for the specified modified alkyd primer for certain metals such as stairs, handrails, and doors. Additionally, an upgrade in the surface preparation requirement for exterior metals was directed. The work was needed because the specified primer was not compatible with the specified epoxy finish coatings. (CN 81)

Bathroom Floor Drains

This was a disputed COTW change order in which floor drains were installed in both the men's and women's rooms in the PEB. The National Plumbing Code required the work. (CN 84)



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### Sanitary Drain Revisions

This work was authorized by NJDEP on a COTW basis after FWEI proceeded without authorization. The scope included the provision of two sanitary drain clean outs and a vent for the slop sink, all in the PEB. The work was required for conformance with the National Plumbing Code. (CN 92)

### Perimeter Road Ditch Partial Elimination

This was a scope of work reduction issued by the NJDEP. The deleted work was two sections of perimeter road ditch totaling some 855 linear feet. The work was deleted because it was not required to meet the project goals. By deleting one section a vehicle access point to the cap area was also gained. The money saved by this change was in the form of FWEI not billing for the unit price work items used to construct the deleted perimeter ditching. (CN 94)

### Heat Tracing Changes

This was a disputed COTW change order that added or altered heat trace cable, added line thermostats and alarms, and added or increased insulation on various pipelines. As bid, some pipelines that were subject to potential freezing conditions were not insulated or heat traced. Furthermore, other pipelines subject to the same conditions did not have an adequate insulation thickness specified or did not specify the proper type of heat trace cable for the application. The changes were required to ensure proper functioning of the pipelines, and in some instances involving heat trace cable, to conform to the electrical code. (CN 104)

### Refuse Outside Cap

This was a disputed COTW change order. The work was to excavate and relocate refuse from outside the landfill's final limits into the cap area. The refuse was uncovered from several locations during excavation of the force main. Included in this was the construction of a lined and capped cell for the refuse. Multiple work orders were used because refuse was encountered at different locations as the force main work progressed. (CNs 108, 121, 130, 132, 133, 136, 143)

### Flow Meter Size Change

This was a disputed COTW change order that modified the diameters of three flow meters at the treatment facility. Two were changed from one inch to three inches and one was changed from six inches to three inches. This work was required to allow flow velocities through the meters to be in an appropriate range for accurate metering. (CN 109)

### Pipe Support Beams

This was a disputed COTW change order. The work was to add eight steel beams to support pipes in the PEB. The beams were attached directly to the main structural members. This was required so that the pipe load would be transferred to the main members in lieu of the weaker building secondary supports as originally designed. (CN 115)



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### SBR Catwalk Extensions

This was to provide catwalk extensions to access the reactor decant pumps for both Sequencing Batch Reactors. The reactor decant pumps were inaccessible from the designed catwalk. The catwalk extensions were added by FWEI at OBG's direction, albeit under protest. After their installation, the NJDEP advised FWEI that the NJDEP would pay for the catwalk extensions on a COTW basis. (CN120)

### Septic System Test Pits

This was a disputed COTW change order. The work was to perform two test pits in the proposed septic system location. The test pits were needed to collect soil samples for geotechnical evaluation and appraise the soil horizon, both as required by the New Jersey Administrative Code. (CN 122)

### Turbidity Meter Off Line Mounting

This was a disputed COTW change order tying the turbidity meter flow sensor into a smaller diameter pipe loop that was added to the sand filter discharge piping. This was required to provide properly pressurized flow through the turbidity meter for accurate process monitoring. (CN 126)

### Basin D Cap Drainage Ditch Deletion

This was a scope of work reduction issued by the NJDEP. The deleted work was the cap drainage ditch in Detention Basin D. The work was deleted because it was not required to meet the project goals. The money saved by this change was in the form of FWEI not billing for the unit price items that would have been used to construct the deleted work. (CN 128)

### Security System Revisions

This was a disputed COTW change order affecting the security systems in the PEB and GEB. The work included substituting (upgrading) the security system panels, door contacts, and local audible alarms with different manufacturer components that met Underwriters Laboratory and hazardous atmosphere requirements. Motion detectors and sensors were also eliminated both because of concerns about false alarms and to use the contract credit to pay for the rest of the change. The changes were made before any of the affected devices were procured or installed. (CN 129)

### Uncovering Work I

This was the first of two instances where FWEI was required to uncover work that was then found to conform to contract requirements. Per the contract, in such cases FWEI would be due reimbursement for its costs to uncover the work. This first instance concerned whether a certain drain line had a required bituminous coating, which it was found to have after being uncovered. A change order would have been processed on a COTW basis but for the ongoing disputes FWEI had concerning the COTW provisions of the contract. (CN 144)



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Bathroom Wall Extensions

This was a disputed COTW change order. The work was to provide a stud wall in both the women's and men's rooms in order to provide proper structural support for the specified shower stalls. This was needed because the specified shower manufacturer required the shower stalls to be supported on three sides and not two sides as shown on the contract drawings. (CNs 149, 157)

Water Heater Expansion Tank

This was a disputed COTW change order in which FWEI installed an expansion tank on the domestic hot water line as directed by DCA. This was required to conform to a code change that occurred after the project was bid. (CN 152)

Septic System Modifications

This was to make changes in the septic system. The changes were made by OBG via the issuance of field modifications. The major change was from a trench system to a disposal bed. This was required because of ledge rock that was encountered during the installation of the trench system. Also during the septic system permit application process, FWEI had a dispute with OBG regarding certain permit driven construction details. During the administration of the field modifications, FWEI was advised by the NJDEP that demonstrated and compensable changes to resolve these issues would be paid for on a COTW basis. (CN160)

Heat Tracing PVC Pipe

This was to substitute a different make and model number for heat tracing to be used on certain PVC piping in the tank farm. The substitution was required because the specified heat trace cable could operate at temperatures exceeding the limit for the PVC pipe. FWEI made the substitution under protest. During the litigation, the NJDEP advised FWEI that the NJDEP would pay for the heat tracing substitution on a COTW basis. (CN161)

Uncovering Work II

This was the second of two instances where FWEI was required to uncover work that was then found to conform to contract requirements. Per the contract, in such cases FWEI would be due reimbursement for its costs to uncover the work. This second instance concerned whether FWEI damaged a run of polypropylene lined piping by welding pipe support material to the outside of the pipe. When the pipe was opened, the lining was found to be undamaged. A change order would have been processed on a COTW basis but for the ongoing disputes FWEI had concerning the COTW provisions of the contract. (CN 166)

Louver Cover

This was a disputed COTW change order. The work was to seal an open louver in the GEB to prevent leakage of carbon dioxide gas if the fire extinguishing system activated. The louver was open because an exhaust fan, which was specified in the bid, was eliminated as part of the landfill gas collection and treatment modification in 1994. Unfortunately, no finishing details were provided for the open louver when the landfill gas system was deleted. (CN 167)





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### Disconnect Switches

This was a disputed COTW change order. The work was to provide disconnect switches for the sludge rake and flocculator drives for the inclined plate settler, as recommended by the equipment manufacturer and the National Electric Code. (CN 172)

### Emergency Lighting

This was a disputed COTW change order adding self-luminous "EXIT" signs and exterior lights at each exit door. This work was required by DCA to conform to National Electric Code visibility requirements. (CNs 187, 190)

### Additional Alarm Bell I

This was a disputed COTW change order that added an alarm bell to the blower room in the PEB. This work was required by DCA to make the PEB audible alarm system conform to National Fire Protection Association (NFPA) noise level standards. (CN 189)

### Additional Alarm Bells II

This was a disputed COTW change order in which two alarm bells were added to the PEB carbon room and the PEB filter press room. This work was required by DCA to make the PEB audible alarm system conform to NFPA noise level standards. (CN 192)

### Emergency Lighting Control Relays

This was a disputed COTW change order. The work was to provide control relays in an enclosure so that the emergency lighting equipment would energize in the event of a regular lighting circuit failure. This was needed to conform to National Electric Code requirements. (CN 193)

### Door Louver Installation

This was a disputed COTW change order that added two supply air grilles to the door of the PEB equipment storage room. This room housed the gas-fired hot water heater, and the grilles allowed for adequate combustion air in the room when the door was closed. This work was required to satisfy Building Officials and Code Administrators (BOCA) standards. (CN 197)

### Handrail System and Shunt Trip Circuit

This was a disputed COTW change order. The work was for two unrelated work items. The first item was the provision of a safety handrail around an exhaust fan on the PEB roof. The railing was required by the DCA because the fan was too close to the edge of the roof for routine maintenance and servicing without a safety handrail around it. The second item was the provision of a supervisory circuit for the GEB fire protection shunt trip circuit. This allowed a trouble signal to be sent to the central monitoring station upon loss of power. This would result in immediate attention to the fire protection system. This was required by the DCA to conform to NFPA standards. (CNs 199, 246)



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### Potable Water System Testing

This was a disputed COTW change order. This was to make certain operational adjustments in the potable water treatment system in an effort to reduce the corrosivity of the water as measured by its Langlier Index. This was required because the Langlier Index was not in compliance with Chester Township standards. (CN 206)

### Potable Water System Modification

This was a disputed COTW change order. The work was to modify the potable water treatment system because adjustments to the system failed to reduce the Langlier Index of the water as required by Chester Township. The modification included the removal of the brine tank, installation of a resin to reduce metals, and the use of a chemical mixture to reduce corrosivity. (CN 217)

### Total Kjeldahl Nitrogen Testing

This was a disputed COTW change order. The work was to provide for off-site total Kjeldahl nitrogen (TKN) testing as part of ground water treatment monitoring. Because TKN testing was required to be performed under a fume hood, the testing could not be performed in the on-site laboratory. (CN 222)

### Tank T-109 Access Ladder

This was a disputed COTW change order. The work was to remove and replace the Tank T-109 access stairs with an access ladder. This was required because the stairs fell into an unclear portion of the OSHA regulations relative to their angle-with-the-horizontal. Replacement of the stairs with a ladder ensured compliance with OSHA and provided a treatment facility safety upgrade. (CN 226)

### Low Air Pressure Alarm

This was a disputed COTW change order. The work was to install a pressure switch in the compressed air system and wire it to the treatment facility's programmable logic controller. This was needed to ensure that a "low pressure-immediate attention required" type alarm was generated when the air receiver tank pressure dropped to a certain level. Such an alarm is particularly important during periods of unmanned plant operation and cold weather, since the HVAC system requires compressed air for operation. (CN 227)

### HVAC Freezestats

This was a disputed COTW change order. The work was to remove one freezestat completely and to remove and relocate another one. Both of these freezestats were shutting down the heaters in the PEB because they were registering very cold air temperatures in their original location. OBG determined that one freezestat could be completely eliminated, and the second freezestat could be installed some distance from the outside air louver, thereby correcting this problem. (CN 230)



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Catwalk Ladder Safety Cage

This was to provide a safety cage for the tank farm catwalk ladder. Although the existing ladder was in conformance with applicable OSHA requirements, FWEI was concerned that a safety cage was needed. Following discussions between FWEI and NJDEP management, the NJDEP agreed to pay for the fabrication and installation of a safety cage. When FWEI later submitted engineering information for which it expected compensation, a dispute arose and the cage was never installed. (CN 231)

Phase Loss Protection

This was to provide phase loss protection for the incoming electrical service. This was needed because of incoming service irregularities that had damaged certain equipment. FWEI never performed the work as directed by the NJDEP. (CN 234)

6. *Claims*

As shown in the table below, FWEI identified 258 claims during the project and the litigation that followed. FWEI first filed Change Notices (CNs) to track issues that could potentially become a claim against OBG or the NJDEP. When an issue became a claim it kept its CN designation.

CN NO.	DESCRIPTION
0	Miscellaneous CN Costs
1	7 Day Contract Time Extension for Contract Notification
2	Shop Drawing Review Turnaround Time by OBG
3	Notice to Proceed Delay
4	Parker Road Opening Permit
5	Shop Drawing Shipping to OBG in Syracuse, NY
6	JCP&L Transmission Tower Grounding
7	Inclement Weather March and April 1993
8	Parker Road Drainage
9	EPA Indemnification
10	Truck Crossing Signs
11	Confined Space Entry
12	Permanent Road Deletion
13	Department of Community Affairs Permit
14	Air Monitoring
15	Final Topography Discrepancy
16	Approved Shop Drawings
17	Long Distance Telephone Charges
18	Invoice Prompt Payment Act Interest
19	Fence Suspension of Work
20	Monitoring Well MW-13 Scope
21	Additional Surveying for Well Relocations
22	Additional Well Screen Lengths
23	Additional Test Pits



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CN NO.	DESCRIPTION
24	Revised Grading Plan Due to Extra Refuse
25	Reduced Perimeter Road Elevations
26	Extension 1- Pay Items 8 & 9
27	Conversion of Temporary Road to Permanent Road
28	Drum Removal
29	Gas Extraction Building Finishing Schedule
30	Subcontractor Mark-ups
31	Gabion Filter Fabric
32	Motor Control Center #1 Additional Sections
33	Cap Extension Area 14
34	Additional Power Panel TPP-1A
35	Landfill Gas Exhausters Upgrade
36	Topsoil & Seed Outside Cap
37	DCA Modifications 3 & 10 (Electrical)
38	DCA Modifications 4 & 7 (Structural)
39	DCA Modification 6 (Tethering)
40	DCA Modifications 2,5,13,14 (Metals)
41	DCA Modifications 11 & 12 (Plumbing)
42	Extension 2 – Pay Items 8 & 9
43	DCA Modification 18 (Structural)
44	Bonding Cost for Change Order Work
45	Ground Water Recovery System Changes
46	Cap Extension Basin D
47	Recovery Well Redevelopment
48	Parker Road Overlay
49	Cablecon Credit
50	PVC Conduit Credit
51	Programmable Logic Controller Data Highway
52	Elimination of Landfill Gas Collection & Treatment System
53	Cap Perimeter Toe Drain and Additional Liner
54	Additional Drum Removal
55	Refuse Relocation at Tower 168
56	Cap Material Overage-Undefined Differing Condition
57	SBR Modification
58	Diameter Reduction of City Water Line
59	PSE&G Gas Main
60	Perimeter Road Drainage Swale
61	Requests for Information-FW Engineering
62	Methane Build-up
63	9/94 Cap Drainage Pipe Rev
64	Area 12/13 Test Trench
65	Off-specification Drainage Layer Material
66	Filter Press Platform Revision
67	Flanged Magnetic Flowmeters
68	Rip Rap Modification



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CN NO.	DESCRIPTION
69	Building Structural Steel Sandblasting & Painting
70	Programmable Logic Controller Ladder Logic
71	Carbon Dioxide Fire System Signal to Autodialer
72	Perimeter Drainage Ditch Rip Rap
73	Tank Farm Pipe Supports
74	Finish Painting of Metals, Doors, & Windows (Specification Division 5 & 8)
75	Air Compressor Relocation
76	Debagger Revision
77	Revised Air Compressor Piping
78	Refrigerated Air Dryer Installation Details
79	Side Slope Diversion Ditch Lining and Extensions
80	Equipment Drain Revision
81	Prime Paint Substitution for Metals, Doors & Windows (Specification Division 5 & 8 )
82	Finish Painting of Equipment & Tankage (Specification Division 11 & 13)
83	Turbidity Sensor Enclosure-CN 117
84	Process Equipment Building Bathroom Floor Drains
85	Plant Water System Coatings
86	Mechanical Drawing Inconsistencies-CN 88
87	Programmable Logic Controller Symbols & Control
88	Above Ground Pipe Interferences-CN 86
89	Magnetic Flowmeter Pipe Changes
90	Weather Station Dismantling
91	Exterior Piping Conflicts
92	Sanitary Drain Revision
93	Tank T-106 Level Transmitter
94	Deletion of Perimeter Road Ditches in Area 12
95	Powdered Activated Carbon Storage
96	Additional Roof Support
97	Conduit Consolidation
98	Storage of Spent Laboratory Chemicals
99	Heat Tracing of Relocated Effluent Flowmeter FE-03
100	Intrinsic Safety Barriers for Flygt Switches
101	Manufacturers of Pumps P-114, P-115, P-116
102	Extension of Process Equipment Building Mezzanine
103	Reorient Tanks T-104 & T-106
104	Heat Tracing Changes
105	Tanks T-101 & T-110 Additional Rebar
106	Relocate Filter Press Drain
107	Gas Extraction Building Floor Drains
108	Refuse Outside Cap at Sta 77+50
109	Flowmeter Size Changes
110	Recovery Well Vault Elevations



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<b>CN NO.</b>	<b>DESCRIPTION</b>
111	Power Circuit PC-1 Conductor Change
112	Gas Extraction Building Lighting Switch Location
113	Ball Valve Design Error
114	6 Inch Chemical Containment Pipe
115	Additional Beams for PEB Pipe Support
116	Flow Control Valve FCV-01 Sizing
117	Turbidity Sensor Enclosure-CN 83
118	Power Circuits PC-30 & PC-32 Conduit Size Increase
119	Pipeline Expansion Joints
120	SBR Catwalk Extensions
121	Refuse Outside Cap at Sta 24+00-CN 108
122	Septic System Design-Test Pits
123	Side Slope Diversion Ditch Layout
124	Catwalk Pipe Supports
125	Sodium Hydroxide Pretraced Pipe
126	Off-line Mounting of Turbidity Sensor
127	Conductor Testing
128	Elimination of Cap Drainage Ditch at Basin D
129	Security System Changes
130	Refuse Outside Cap at Sta 39+40-CN 108
131	Alternate Potable Water Supply
132	Refuse Outside Cap at Sta 46+50-CN 108
133	Refuse Outside Cap at Sta 48+00-CN 108
134	Ductwork Insulation
135	Process Pipe Insulation
136	Drums & Refuse Outside Cap at Sta 75+50-CN 108
137	Flexural Modulus Tanks T-107 & T-109
138	Additional Equipment Pads
139	Equipment Storage Room Bond Beam
140	Debagger Explosion Proof Motors
141	SBR Pump Discharge Valves
142	Air Handling Units Temperature Controls-CN 151
143	Refuse Outside Cap - Area 13 Cap Edge Revision
144	Uncovering Tank Farm 6" Drain
145	Tank T-103 Installation
146	Additional Carbon Dioxide Fire System Signs
147	Perimeter Road Layout Adjustment
148	Mechanical Equipment Layout
149	Process Equipment Building Bathroom Shower Stall-CN 157
150	Cap Surface Water Ditch Failures
151	HVAC Electrical Changes by OBG-CN 142
152	Hot Water Heater Expansion Tank
153	Instrument Wire-Shield Twisted Cable
154	Process Equipment Building Finish Ceiling Height



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CN NO.	DESCRIPTION
155	Alternate Potable Water Supply Installation
156	JCP&L Incoming Service Standards
157	Process Equipment Building Shower Wall Extension - CN 149
158	Refuse Outside Cap at Sta 69+00
159	None
160	Septic System Modifications
161	Heat Trace PVC Pipe to Tank T110
162	Equipment Identification / Tagging
163	Pipe Support Design Errors
164	Varnishing Carbon Steel Air Pipe
165	Filter Press Platform Extension
166	Inspection of Polypropylene Lined Steel Pipe
167	Covering Gas Extraction Building Louver
168	Adding Laboratory Casework Locks
169	Catwalk Lights Photocells
170	10/5/95 Rain Event
171	Catwalk GFCI Explosion Proof Receptacles
172	Disconnect Switches for Inclined Plate Settler
173	Disconnect Switches for SBR Electric Valves
174	Topsoil & Seed Outside Cap
175	Ground Water Recovery Well Vault Sump Pumps
176	Winter 1995/1996 Weather
177	Modification of Tank T-107 Support Frame
178	Incoming Electrical Service Anomalies
179	HVAC Operational Deficiencies
180	Tank T-108 Piping
181	Underground Pipe Insulation
182	Nalgene Tube Pressure Test
183	Filter Press Valve
184	Boilers to De-ice SBR's
185	Force Main Air Relief Valves
186	1/17/96 DCA Fire Inspection
187	Emergency Lighting-CN 190
188	Seeding of SBR's
189	Blower Room Alarm Bell
190	Emergency Egress Lighting-CN 187
191	Additional Lab Pipe, Shelf, Receptacles
192	Additional Alarm Bells
193	Emergency Lighting Electrical Requirements
194	OBG Access for Inspection
195	HDPE Dresser Couplings
196	Sodium Hydroxide Concentration
197	Equipment Storage Room Door Louver
198	Testing of Emergency Eyewash Backflow Preventers



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CN NO.	DESCRIPTION
199	Exhaust Fan EF-5 Railing & Motor Control Center 2 Shunt Trip
200	4/23/96 DCA Fire Inspection
201	Tank T-101 Aerator Testing
202	San Filter SF-101A/B Explosion Proof Panels
203	OBG Deficiency Lists
204	OBG O&M Manual Comments
205	Epoxy Coating for Polypropylene Lined Steel Pipe
206	Potable Water Treatment System Adjustment
207	Tank T-107 Flange Repair
208	Reinspect Deficiency List Items
209	Disconnect Switches Not Shown on Contract Drawings
210	Gas Extraction Building Exhaust Duct Damper
211	Pressure Gauge Seals
212	FWEI Monitoring of OBG Cap Ditch Repairs
213	Deficiency List Items Performed under Protest by FWEI
214	Galvanized Conduit Versus PVC Conduit
215	Inclined Plate Settler Design
216	Programmable Logic Controller Changes
217	Potable Water Treatment System Changes
218	Ground Water Recovery Well Control Panels
219	Pumps P-121A/B & P-106 Interlocks
220	Leaves Clogging Equipment
221	Tank T-109 Platform Ladder OSHA Violation-CN 226
222	Off-site Total Kjeldahl Nitrogen Testing
223	pH Interlock with Pumps P-101A/B
224	Project Schedule Delay Costs
225	Project Schedule Acceleration Costs
226	Tank T-109 Platform Ladder OSHA Violation-CN 221
227	Automatic Low Pressure Air Alarm Signal to Operator After Hours
228	Ground Water Recovery Well Flow Sensors
229	Heat Trace Alarms
230	Air Handling Unit Freezestat Changes
231	Catwalk Ladder Cage
232	Effluent pH Adjustment
233	Phase Loss Protection
234	Surge Protection
235	Tank T-109 Debagger Operation
236	Water Allocation Permit Reporting Requirements
237	Explosion Proof Pumps Thermostat Lead Wiring
238	Sequencing Batch Reactors Low Temperature Operation
239	Sequencing Batch Reactors Supplemental Feeding
240	Inclined Plate Settler Failure
241	Ground Water Recovery Well Timer Resetting





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CN NO.	DESCRIPTION
242	Topsoil Conductivity
243	Air Compressor Starter Coil
244	Sludge Disposal after 1/25/97
245	Force Main Hydrotesting After Coupling Repairs (CN 195)
246	Carbon Dioxide Fire System Shunt Trip Relay
247	Excess Reprocurement Cost (Rand Termination)
248	Prejudgment Interest Costs
249	Premium Time-Craft Labor Overtime on Contract Work
250	Holiday Costs During Extended Period of Performance
251	Additional Wage Rate Categories Used
252	Inefficiencies Due to Necessary Overmanning
253	Unanticipated Supervision Personnel Needed
254	Unanticipated Support Personnel Needed
255	Claim Preparation Costs-Outside Counsel
256	Alternative Dispute Resolution
257	Labor Broker Use after Rand Termination
258	Insurance, General Liability

During the early phases of construction there were concerns about the number and complexity of CNs being initiated by FWEI. In response to this in September 1993 the NJDEP engaged the services of a claims consultant, Barba-Arkhn International, Inc. As construction progressed the number and complexity of CNs submitted by FWEI continued to expand. The CNs being generated by FWEI revolved around two central issues. The first issue was the provision of pollution liability. The second issue was with the technical specifications and drawings. While a number of lawsuits resulted from the contract with FWEI, there were 3 major lawsuits - Rand vs. FWEI (filed May 1994), Cacon vs. Rand (filed February 1995), and FWEI vs. NJDEP and OBG (filed June 1996). During the litigation these lawsuits were consolidated into one case. When initially filed, the FWEI suit was for \$31.6 million, but as the case progressed the lawsuit grew to over \$62 million by 2002.

After several meetings with the judge assigned to the case the parties were ordered into mediation in August 1996. In February 1997 the parties began mediation using the State Office of Dispute Resolution. As the lawsuit continued, key changes were made to the State's team. A new DAG was assigned to the case and in November 1997 the State engaged the services of outside counsel, Shapiro, Lifschitz, and Schram, P.C. Mediation continued through 1998 but was unsuccessfully concluded in April 1999. Full document discovery proceeded in Spring 1999. Depositions began in April 2000 and continued into 2002. Expert reports were exchanged in January and May 2002. After a series of successful NJDEP and OBG dispositive motions in December 2002 and February 2003, FWEI initiated settlement discussions. The case was settled in fall 2003, although formal dismissal of FWEI's lawsuit occurred later. The settlement netted FWEI \$15 million as follows: USEPA \$10.8 million; State of New Jersey Potential Responsible Parties \$2.0 million; NJDEP \$1.2 million; and OBG \$1.0 million.



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**B. O'BRIEN & GERE ENGINEERS, INC.**

*I. Overview*

Between 1993 and 1999 OBG provided resident engineering and design services during construction of the remedy. When FWEI left the project in February 1997 without completing the project, OBG was also retained between 1997 and 1999 to act as the general contractor. Additionally, between 1997 and 2000 OBG provided technical support related to operation of the remedy. All of these services were furnished under Remedial Design Contract S88125.

The certified public accounting firm of Leonard G. Birnbaum and Company, LLP conducted an independent audit of the amounts paid to OBG under Contract S88125. The audit report was finalized on September 26, 2006 and summarizes the following costs for the services identified above.

*Resident Engineering and Design Services during Construction*

Base resident engineering and design services contract .....	\$3,849,115.80
Resident engineering and design services change orders .....	<u>\$2,487,368.88</u>
Resident engineering and design services contract subtotal .....	\$6,336,484.68
Resident engineering and design services payments less retainage.....	\$5,569,198.59
Resident engineering and design services retainage withheld.....	(\$618,799.95)
Resident engineering and design services partial retainage release 1997.....	\$512,940.43
Resident engineering and design services retainage release following audit ....	<u>\$105,859.52</u>
Resident engineering and design services total payments .....	\$6,187,998.54

*Construction Completion Services as General Contractor*

Construction completion change orders total .....	\$1,771,910.17
Construction completion payments less retainage.....	\$1,563,372.54
Construction completion retainage release following audit.....	<u>\$56,511.41</u>
Construction completion total payments .....	\$1,619,883.95

*Technical Support Services during Remedy Operation*

Technical support change orders total .....	\$160,637.75
Technical support payments less retainage.....	\$99,544.59
Technical support retainage release following audit .....	<u>\$11,060.52</u>
Technical support total payments .....	\$110,605.11

*Total Amount of all Contracts and Change Orders.....* *\$8,269,032.60*



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*Total Payments for All Services*.....\$7,918,487.60

*2. Change Orders*

During the course of the Remedial Action work, OBG was issued 24 change orders by execution and processing of the State's Contract Modification Proposal and Acceptance Form (DWM-042). A list of OBG's change orders follow.

1. Extension of Construction Supervision Services (CO 96-010RE-01).....	\$550,010.25
2. Effectiveness Monitoring (CO 96-010RE-02) .....	\$39,138.73
3. Extension of Construction Supervision Services (CO 96-010RE-03).....	\$231,942.65
4. Extension of Construction Supervision Services (CO 97-010RE-04).....	\$296,967.30
5. Cap Drainage System Repairs (CO 97-010RE-05) .....	\$830,691.24
6. Extension of Construction Supervision Services (CO 97-010RE-06).....	\$298,482.20
7. Extension of Construction Supervision Services (CO 97-010RE-07).....	\$271,936.13
8. Perimeter Ditch Cleanout (CO 97-010RE-08) .....	\$26,611.24
9. Temporary Plant Shutdown (CO 97-010RE-09) .....	\$99,014.02
10. Cap Drainage System Repairs (CO 97-010RE-10) .....	\$182,744.08
11. Treatment Facility Substantial Completion (CO 97-010RE-11) .....	\$400,938.69
12. Extension of Construction Supervision Services (CO 97-010RE-12).....	\$287,800.85
13. Cap Drainage System Repairs (CO 97-010RE-13).....	\$51,226.99
14. No-Cost Time Extension of Construction Supervision Services (CO 98-010RE-14).....	\$0.00
15. Cap Substantial Completion (CO 98-010RE-15) .....	\$77,982.74
16. Extension of Construction Supervision Services (CO 98-010RE-16).....	\$154,932.98
17. Final Completion (CO 98-010RE-17) .....	\$395,296.52
18. Mowing (CO 98-010RE-18).....	\$14,750.00
19. Landfill Gas Emissions Testing (CO 98-010RE-19).....	\$9,211.55
20. Phase Loss and Voltage Protection (CO 98-010RE-20) .....	\$13,131.50
21. No-Cost Time Extension of Construction Supervision Services (CO 98-010RE-21).....	\$0.00
22. Cap Drainage Repairs (CO 99-010RE-22).....	\$2,921.17
23. No-Cost Time Extension of CO 96-010RE-02 Effectiveness Monitoring (CO 99-010RE-23).....	\$0.00
24. Insulation Replacement (CO 99-010RE-25) .....	\$85,000.00



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Extension of Construction Supervision Services (CO 95-010RE-01)<sup>17</sup>

This was for \$550,010.25 to extend the construction supervision (resident engineering) services of OBG for up to 5 months from December 1, 1995 to April 30, 1996 along with an increase in OBG's budget. The extension of services was needed because of project delays.

Effectiveness Monitoring (CO 96-010RE-02)

This was for \$39,138.73 to modify OBG's scope to include monitoring of the ground water collection system to determine how well the system was operating and to advise NJDEP of operational adjustments to optimize capture of contaminated ground water. Collaterally, OBG's contract term was extended for one year from May 1, 1996 to May 1, 1997. Effectiveness monitoring was not included in OBG's scope and was needed because the construction contractor (FWEI) would not provide these services during its one year operational period as had been envisioned.

Extension of Construction Supervision Services (CO 96-010RE-03)

This was for \$231,942.65 to extend the construction supervision services for up to three months from May 1, 1996 to July 31, 1996 along with an increase in OBG's budget. The extension of services was needed because of project delays.

Extension of Construction Supervision Services (CO 97-010RE-04)

This was for \$296,967.30 to extend the construction supervision services for up to three months from August 1, 1996 to October 31, 1996 along with an increase in OBG's budget. The extension of services was needed because of project delays.

Cap Drainage System Repairs (CO 97-010RE-05)

This was for \$830,691.24 to engage OBG to repair portions of the cap's surface water collection system that had failed in January 1996. OBG was engaged on a COTW basis to perform construction work because FWEI refused to repair the work.

Extension of Construction Supervision Services (CO 97-010RE-06)

This was for \$298,482.20 to extend the construction supervision services for up to three months from November 1, 1996 to January 31, 1997 along with an increase in OBG's budget. The extension of services was needed because of project delays.

Extension of Construction Supervision Services (CO 97-010RE-07)

This was for \$271,936.13 to extend the construction supervision services for up to three months from February 1, 1997 to April 30, 1997 along with an increase in OBG's budget. The extension of services was needed because of project delays.

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<sup>17</sup> The designation 95-010RE-01 is described as follows: "95" is the State fiscal year 1995; "010RE" identifies CFSL project Resident Engineering; "01" is the first sequential number for all CFSL Resident Engineering change orders. The other OBG change orders were designated in a like manner even when the work was not resident engineering



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### Perimeter Ditch Cleanout (CO 97-010RE-08)

This was for \$26,611.24 for construction work to clean out the perimeter road ditch of silt deposition and to repair eroded areas under the gabion wall. This work is related to CO 97-010RE-05 in that most of the silt came from the cap surface water control failures. This change order also extended at no additional cost the period of performance of CO 96-010-02 from May 1, 1997 until August 30, 1998.

### Temporary Plant Shutdown (CO 97-010RE-09)

This was for \$99,014.02. OBG was authorized to temporarily shutdown and maintain the treatment facility and to provide site security after FWEI left the project in February 1997.

### Cap Drainage System Repairs (CO 97-010RE-10)

This was to compensate OBG in the amount of \$182,744.08 for out of scope services performed under Change Order 97-010RE-05. This change order was required due to two changed conditions and weather-related delay not included under Change Order 97-010RE-05. The changed conditions were undersized surface water collection berms and indiscernible subsurface erosion. The weather-related delay was compensable because of the time and material provisions of Change Order 97-010RE-05.

### Treatment Facility Substantial Completion (CO 97-010RE-11)

This was for \$400,938.69 to have OBG repair and start up the treatment facility due to FWEI leaving the project. As with the cap drainage repairs, this work was not competitively bid because OBG was able to perform without further project delay.

### Extension of Construction Supervision Services (CO 97-010RE-12)

This was for \$287,800.85 to extend the construction supervision services for up to three months from May 1, 1997 to July 31, 1997 along with an in kind increase in OBG's budget. The extension of services was needed because of project delays. During this period OBG had to provide construction supervision services to oversee its own direct forces and subcontractors performing the work under the various change orders issued by NJDEP to complete the project.

### Cap Drainage System Repairs (CO 97-010RE-13)

This was for \$51,226.99 to compensate OBG for out of scope cap drainage system repair work, including compensable weather-related delay, performed under Change Order 97-010RE-05. This was a follow up to change order CO 97-010RE-10. Under this change order OBG was compensated for additional weather-related delay, an upgrade from standard seedbed binder to Soil Guard Mulch, and for deployment of plastic covers to protect certain repair areas that had topsoil sloughing. The Soil Guard Mulch and plastic covering were required due to the repair work being completed too late in 1996 to obtain a suitable stand of grass. Both the mulch and plastic covering were to provide erosion protection for winter 1996 until the next growing season in spring 1997. The main reasons the work was completed late were the changed conditions addressed under CO 97-010RE-10 and compensable weather-related delay.



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No-Cost Time Extension of Construction Supervision Services (CO 98-010RE-14)

This was a no cost time extension to extend the construction supervision services of OBG from August 1, 1997 to September 6, 1997. The extension of services was needed because of project delays.

Cap Substantial Completion (CO 98-010RE-15)

This was for \$77,982.74 for work performed by OBG to bring the landfill cap to substantial completion. The major work included reseeding and irrigating some 13 acres of cap that were disturbed during the cap repairs in 1996; repairing a drainage layer pipe; and repairing topsoil slumps and erosion on limited cap repair areas from 1996. The reseeding and irrigation were required because the cover in select portions of the cap was not yet a dense stand of grass. The drainage layer pipe repair was an item not completed by FWEI. Last, the repair of topsoil slumps and erosion in the cap repair areas was required because an adequate grass cover had not developed to protect the areas. Despite OBG's efforts, the work in 1996 was completed too late in the growing season for an adequate grass cover to be established.

Extension of Construction Supervision Services (CO 98-010RE-16)

This was for \$154,932.98 to extend the construction supervision services for up to three months from September 8, 1997 to December 5, 1997 along with an increase in OBG's budget. The extension of services was needed because of project delays.

Final Completion (CO 98-010RE-17)

This was for \$395,296.52 to bring the entire project to Final Completion. The work performed by OBG was both cap and treatment facility related and had to be performed by OBG due to FWEI leaving the project. The scope consisted of 174 separate work items that FWEI either didn't complete or constructed incorrectly. The 174 items performed were out of 301 items still left from an OBG generated deficiency list of over 1,000 items. The remaining 127 items were deferred until such time as they may have required performance. The scope was divided into the following specific areas of work: electrical; mechanical; doors; fences; gauges; piping; painting; grading; HVAC; miscellaneous; and demobilization.

Mowing (CO 98-010RE-18)

This was for \$14,750.00 to have OBG mow the cap and certain other on-site areas. Mowing had not been included in any of the prior construction change orders under which OBG was completing the project due to FWEI leaving the project. Mowing had to be performed to properly maintain the stand of grass on the landfill, as well as to help identify areas that needed to be reseeded or otherwise repaired.

Landfill Gas Emissions Testing (CO 98-010RE-19)

This was for \$9,211.55 to have OBG perform testing of landfill gas from eight gas vents to confirm the appropriateness of OBG's 1994 recommendation to delete active gas collection and treatment in favor of passive gas venting. This work was not construction work, but rather engineering services.



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Phase Loss and Voltage Protection (CO 98-010RE-20)

This was for \$13,131.50 to have OBG obtain permits and install phase loss and under/over voltage protection devices for the treatment facility. The work was shown to be necessary in 1995 and 1996 when electrical service anomalies damaged certain electrical equipment. After a power quality study helped OBG to define the required scope of work, OBG generated a design modification. It is noted that FWEI was directed to procure and install such as a device, but FWEI did not perform this work before it left the project.

No-Cost Time Extension of Construction Supervision Services (CO 98-010RE-21)

This was a no cost time extension to extend the construction supervision services of OBG from December 6, 1997 to February 28, 1998. The extension of services was needed because of project delays.

Cap Drainage Repairs (CO 99-010RE-22)

This was for \$2,921.17 and included payment for work that was excluded from Change Order 98-010RE-15. As part of CO 98-010RE-15, certain work performed by OBG was not to be compensated until it could be established that the work was in satisfactory condition after 1 year. The year had passed and the work was paid for under this change order.

No-Cost Time Extension of CO 96-010RE-02 Effectiveness Monitoring (CO 99-010RE-23)

This no cost change order extended the period of performance of CO 96-010RE-02 from August 30, 1998 until September 30, 1998. This work continued into the O&M phase of the project under change orders CO 99-010RE-24, CO 00-010RE-26, and CO 01-010RE-27 to OBG.

Insulation Replacement (CO 99-010RE-25)

This was for \$85,000.00 and was effectively an extension of CO 98-010RE-17 for project Final Completion. As part of CO 98-010RE-17, OBG was to correct some FWEI insulation-related construction deficiencies. Performance of that work was prefaced with the caveat that the full scope of work would not be known until the insulation was uncovered and inspected along with the heat trace system. When the work began it became clear that the scope was larger than envisioned, and additional funds were needed to complete it.

*3. Claims*

OBG filed no claims against the State in connection with resident engineering services or the finishing of the construction left incomplete by FWEI.

**C. O'BRIEN & GERE OPERATIONS, INC.**

*1. Overview*

OBG Operations, Inc. (OBG Ops) was issued a \$975,570.00 contract for the one year operational and functional period after Substantial Completion, again necessitated because FWEI did not perform the work. Of this amount, \$527,696.39 was paid and \$48,580.41 was held as retainage. The following is a cost summary for the operational and functional period.



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Base contract amount.....	\$975,570.00
Total negotiated change orders .....	<u>\$0.00</u>
Base contract and negotiated change orders subtotal .....	\$975,570.00
Base contract net payments.....	\$527,696.39
Negotiated change order net payments .....	<u>\$0.00</u>
Net payments subtotal.....	\$527,696.39
Base contract retainage withheld .....	\$48,580.41
Negotiated change order retainage withheld.....	<u>\$0.00</u>
Retainage subtotal .....	\$48,580.41
Total cost (net payments plus retainage) .....	\$576,276.80

*2. Change Orders*

No change orders were issued to OBG Ops for work related to the operational and functional period.

*3. Claims*

OBG Ops filed no claims against the State.

**D. BARBA-ARKHON INTERNATIONAL, INC./NAVIGANT CONSULTING, INC.**

*1. Overview*

Barba-Arkhn International, Inc.'s. (BAI) base contract was for \$449,280.59. BAI received a total of \$3,366,563.93 in change orders, bringing BAI's total contract to \$3,815,844.52. BAI was paid \$3,474,588.59 in base contract and change order work. Retainage in the amount of \$173,729.47 was released in July 2004 when it was determined that a financial audit was not required for this contract.

*2. Change Orders*

BAI was issued thirteen change orders resulting in the execution and processing of a state Contract Modification Proposal and Acceptance Form (DWM-042). A listing and description of BAI's change orders follow.

1. Subcontracting/Redistribution of Original Contract Funding (CO 96-010CM-01)..... \$0.00
2. Extension of Claims Mitigation Consultant Services (CO 97-010CM-02) .....\$0.00
3. Audit of FWEI Financial Records by Subcontractor (CO 97-010CM-03) .....\$0.00
4. Extension of Claims Mitigation Consultant Services (CO 97-010CM-04) .....\$103,468.05
5. Extension of Claims Mitigation Consultant Services (CO 97-010CM-05) .....\$110,079.89
6. Extension of Claims Mitigation Consultant Services (CO 98-010CM-06) .....\$222,056.59





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7. Extension of Claims Mitigation Consultant Services (CO 98-010CM-07) .....	\$549,291.15
8. Extension of Claims Mitigation Consultant Services (CO 99-010CM-08) .....	\$0.00
9. Extension of Claims Mitigation Consultant Services (CO 99-010CM-09) .....	\$259,861.46
10. Extension of Claims Mitigation Consultant Services (CO 01-010CM-10) .....	\$644,534.58
11. Extension of Claims Mitigation Consultant Services (CO 01-010CM-11) .....	\$887,138.67
12. Extension of Claims Mitigation Consultant Services (CO 03-010CM-12) .....	\$590,133.54
13. Extension of Claims Mitigation Consultant Services (CO 03-010CM-13) .....	\$0.00

Subcontracting/Redistribution of Original Contract Funding (CO 96-010CM-01)

This no-cost change order allowed BAI to subcontract with Citadel Engineering & Construction Consultants, L.L.C. (Citadel). This change was necessary because key staff from BAI started up Citadel during the remedial action. It was crucial to retain the services of Citadel due to its inherent involvement with many major claims initiated by FWEI. This change order also allowed NJDEP to combine all of BAI's uncommitted funds for use on any of the specific tasks required by the contract.

Extension of the Claims Mitigation Consultant Services Contract (CO 97-010CM-02)

This no-cost change order extended BAI's project schedule for two months from June 1996 to August 1996. This extension was intended to allow BAI to complete its original scope of work, as well as several specific tasks it was directed to perform in response to the litigation initiated by FWEI in June 1996.

Preliminary Audit of FWEI Financial Records by Subcontractor (CO 97-010CM-03)

The purpose of this no-cost change order was to allow BAI to subcontract with the independent accounting firm of Ianieri, Giampapa & Co., Inc. to perform an audit of certain limited FWEI financial records. The audit was to provide a preliminary assessment as to whether the monetary damages asserted by FWEI in its claims against the State were legitimate prior to initiating settlement discussions with FWEI.

Extension of Claims Mitigation Consultant Services (CO 97-010CM-04)

This change order in the amount of \$103,468.05 extended BAI's services an additional six months, from August 1996 to February 1997. The extension was necessary due to slip in the construction schedule and the unanticipated volume of claims and Change Notices (CNs) submitted by FWEI against the NJDEP.

Extension of Claims Mitigation Consultant Services (CO 97-010CM-05)

This change order in the amount of \$110,079.89 extended BAI's services an additional six months, from February 1997 to August 1997. The extension was necessary to maintain BAI's claims mitigation consultant services during litigation initiated by FWEI, as well as to review and comment on the 225 claims submitted by FWEI as of that time.



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Extension of Claims Mitigation Consultant Services (CO 98-010CM-06)

This change order in the amount of \$222,056.59 extended BAI's services an additional six months, from August 1997 to February 1998. The extension was necessary to continue BAI's provision of services during the FWEI litigation, including reviewing and commenting on some 243 claims submitted by FWEI as of that time. BAI was specifically tasked with preparing as-planned and as-built CPM schedules, conducting an audit of the EPA indemnification claim, and performing a detailed errors and omissions analysis on design-related claims. It was imperative to keep BAI retained at this time since the NJDEP was ordered by the Morris County Superior Court to participate in mediation, and BAI was to be used to support the NJDEP's interests and to defend against FWEI claims.

Extension of Claims Mitigation Consultant Services (CO 98-010CM-07)

This change order in the amount of \$549,291.15 extended BAI's services an additional twelve months, from February 1998 to February 1999. The extension was necessary primarily due to the ongoing FWEI litigation. FWEI's revised demand listed 246 claims and alleged damages ranging between \$62.4 million and \$67.5 million. In November 1997 the New Jersey Department of Law and Public Safety appointed the law firm of Shapiro, Lifschitz and Schram, P.C. (SLS) to provide litigation counsel to defend the interests of the State of New Jersey regarding FWEI's claims and suit. SLS advised that BAI's involvement in the case would be an integral part of the State's defense against FWEI.

Extension of Claims Mitigation Consultant Services (CO 99-010CM-08)

This no-cost change order extended BAI's services an additional three months, from February 1999 to May 1999. The extension was driven by the FWEI litigation. At the time of this change order, NJDEP estimated that there would be at least \$150,000 remaining in BAI's budget from prior change orders when BAI's current contract extension expired. This surplus was used to fund this contract extension.

Extension of Claims Mitigation Consultant Services (CO 99-010CM-09)

This change order in the amount of \$259,861.46 extended BAI's services an additional eighteen months, from May 1999 to November 2000. The extension was necessary due to the continuation of the FWEI litigation. BAI was to continue to provide expert services regarding scheduling, schedule analysis and claims review. BAI was working closely with, and was largely directed by, SLS in preparing for litigation.

Extension of Claims Mitigation Consultant Services (CO 01-010CM-10)

This change order in the amount of \$644,534.58 extended BAI's services an additional twelve months, from November 2000 to November 2001. The FWEI litigation required this extension. The per unit time cost loading of this change order was substantially increased because the project moved more fully into active litigation. As such, BAI involvement (as directed by SLS) increased, and senior BAI staff members were used on a nearly full-time basis.



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Extension of Claims Mitigation Consultant Services (CO 01-010CM-11)

This change order in the amount of \$887,138.67 extended Navigant's (formerly BAI) services an additional twelve months, from November 2001 to November 2002. The extension was driven by the FWEI litigation and included Navigant's review of FWEI expert reports and issuance of its own expert reports.

Extension of Claims Mitigation Consultant Services (CO 03-010CM-12)

This change order in the amount of \$590,133.54 expanded Navigant's budget during the period from July 2002 until November 2002 and extended Navigant's services from November 2002 to December 2002. The budget increase and contract extension were necessary for the same reasons identified above in CO 01-010CM-11. Navigant's scope of work continued to expand over this period and included the review of the testimony of FWEI fact witnesses and the revision of the as-built schedule based on that testimony. Navigant was also directed by SLS to perform an in-depth review and analysis of FWEI's "reconciliation" process and to provide expert testimony as the State's schedule delay/impact witness.

Extension of Claims Mitigation Consultant Services (CO 03-010CM-13)

This no-cost change order extended Navigant's services an additional six months, from January 2003 through June 2003. The extension was necessary for the same reasons identified above in CO 01-010CM-11 and CO 03-010CM-12.

*3. Claims*

BAI/Navigant had no claims on the CFSL project.

**E. SHAPIRO, LIFSCHITZ, AND SCHRAM, P.C.**

*1. Overview*

As of June 30, 2004, payments to Shapiro, Lifschitz, and Schram, P.C. totaled \$10,290,678.64. Of this amount, \$6,384,166.85 was for legal fees and expenses; \$3,102,788.02 was for expert witnesses; and \$804,347.98 was for document database costs and court expenses.

*2. Change Orders*

There were no change orders.

*3. Claims*

There were no claims.



## VII. Schedule

The construction contract required FWEI to submit a progress schedule showing the start and finish dates for the various stages of the work. Accordingly, FWEI submitted a bar chart schedule in October 1992. Based on comments from OBG and the NJDEP, FWEI revised and resubmitted this bar chart on November 2, 1992. This document, known as the master project schedule, became the baseline schedule for the job. The baseline schedule contained approximately seventy-one activities depicted graphically on a month-by-month basis. According to this schedule, FWEI planned to commence site work in late October 1992 and to achieve Substantial and Final Completion by the originally required dates of March 28, 1995 and May 29, 1995<sup>18</sup>, respectively.

Based on its baseline schedule, FWEI's planned sequence of earthwork and site work was as follows. Mobilization was to begin in late October 1992 and be completed by the end of November 1992. Clearing and grubbing were to commence in early November 1992 and be completed in two months. Meanwhile, the detention basins and associated drainage features were to be formed for soil erosion and sediment control. While these activities were ongoing, FWEI planned to install monitoring wells, gas extraction wells, and ground water recovery wells between December 1992 and the end of January 1993. Also in December 1992, the site perimeter road construction was to begin in preparation for refuse relocation. Between December 1992 and February 1993, refuse relocation and placement of the cap embankment layer were scheduled to occur concurrently, and the soil barrier layer test section was to be completed. Construction of the gabion wall and storm water conveyance structures was scheduled from winter 1992 to spring 1993. Following a weather-related break in cap activities from February 1993 until May 1993, installation of the soil barrier layer was set to commence. The start of the soil barrier layer placement was to be closely followed by the start of the other landfill cap layers, namely the liner and geotextile fabric, the drainage layer and associated piping, the vegetative layer, and the topsoil layer. Capping activities were planned to continue for approximately nine months, ending by January 1994. Seeding of the cap was scheduled to occur in fall 1993 and again in spring 1994. The cap surface water collection ditches were to be completed between September and December 1994. Finishing of the roadways and site fence was set to occur between August 1994 and March 1995.

With respect to the treatment facilities, the baseline schedule shows that FWEI expected to commence construction of the Process Equipment Building, the Gas Extraction Building, and the tank farm in early June 1993. This work was to continue through May 1994 and included foundations and slabs for the buildings and process equipment; building erection; setting of process equipment; tank and platform fabrication and erection; piping, electrical and mechanical work; and process instrumentation. While this work was ongoing, the ground water collection system and the landfill gas condensate piping were to be installed between December 1993 and

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<sup>18</sup> The contract duration, excluding one year of post Substantial Completion systems operation, was specified to be 915 days to achieve Substantial Completion and 975 days to achieve Final Completion. The actual 975<sup>th</sup> day was Saturday, May 27, 1995. Because the contract excludes Saturdays and Sundays from the being the last day in the computation of time, the Final Completion date was moved forward to Monday, May 29, 1995.



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June 1994. Permanent utilities such as potable water, electricity, natural gas, and telephone were to be completed between June 1994 and mid September 1994. Presumably, once the plant construction was complete, acceptance testing and plant start-up would have been performed in the remaining period of time until Substantial Completion.<sup>19</sup>

Despite this plan, FWEI did not meet any of the projected dates on its master project schedule. The project was delayed for reasons that were attributable to both FWEI and the State. The reasons will not be discussed in detail in this section but are set forth in the expert report prepared by Evans Barba of Peterson-Barrington on May 15, 2002.<sup>20</sup> As previously noted, Peterson-Barrington is part of Navigant Consulting, Inc, which acquired Barba-Arkhn International, Inc. (BAI) in 2001.

In the early stages of the project, the NJDEP issued two contract time extensions to FWEI. The first extension was for 7 days and concerned NJDEP notification to FWEI that the contract had been awarded (CN 1). The second extension was for 90 days and concerned multiple issues related to notice to proceed (CN 3), the Chester Township road opening permit (CN 4), inclement weather in 1993 (CN 7), and USEPA indemnification against third party pollution claims (CN 9). The two contract extensions combined resulted in a revised Substantial Completion date of July 3, 1995 and a revised Final Completion date of September 1, 1995.

FWEI revised its schedule several times to reflect the contract time extensions or to address slippage in the planned activities. Unfortunately, the revised schedules were generally not met either. In order to track the project and evaluate project delays, BAI developed a detailed as-built schedule identifying the manner and sequence in which FWEI actually performed its work. The as-built schedule covers the period of time from September 24, 1992, the date the contract was awarded, and February 25, 1997, the date on which FWEI left the project without completing it. BAI then compared the master project schedule to the as-built schedule to identify work sequence changes, schedule gains, or extended periods of performance for specific activities or areas of work. The as-built schedule shows the work progressed in the general time frames outlined below. For exact dates, activity descriptions, or activity durations, Mr. Barba's expert report should be consulted.

Actual work at the site commenced in January 1993 when FWEI began to mobilize the office trailers and install the temporary utilities. Clearing and grubbing and some work on the site access road proceeded thereafter into April 1993, when FWEI suspended significant site work until June 1993. Construction of the site access road and installation of the perimeter fence proceeded when work resumed. Between July 1993 and January 1994, other site work included shaping of the detention basins, refuse relocation and embankment layer placement, placement of the soil barrier layer test section, perimeter road construction, and well installation. Additionally, between October 1993 and January 1994, FWEI constructed the foundation and

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<sup>19</sup> It is noted that FWEI did not include acceptance testing or plant start-up as discrete activities on its master project schedule, although both are prerequisites for Substantial Completion.

<sup>20</sup> The expert report is on file at the offices of the Bureau of Design and Construction and at the Department of Law & Public Safety/Division of Law.



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grade beams for the Process Equipment Building (PEB) and the foundation and floor slab for the Gas Extraction Building (GEB). Installation of some underground piping and electrical conduit was also performed at the time.

Another interruption in site work occurred between mid January and May 1994. Upon resumption of activity in June 1994, FWEI concentrated on refuse relocation, embankment layer and soil barrier layer placement, and gabion wall construction. As the clay layer progressed, FWEI began to deploy liner and geotextile fabric, to place the drainage layer and its associated piping, and to place the vegetative layer. With the exception of the soil barrier layer work that concluded in December 1994, all of these activities continued into January 1995. Minimal cap activity occurred in February 1995. In March 1995 FWEI resumed the placement of the cap vegetative layer and also began to construct the cap surface water controls. This work continued through November 1995. Placement of the cap topsoil layer started in July 1995 and also continued through November 1995. Seeding was performed beginning in late summer and continuing into December 1995. Other site work included the installation of the ground water force main piping and electric between March 1995 and October 1995. While performing this work, some refuse was encountered and relocated to the landfill for capping. Intermittently in spring 1995 and again in summer 1995, FWEI installed the potable water line along the site access road to the treatment facility. Last, the site access road and plant parking lots were paved in December 1995.

Limited work was also performed at the treatment facility between January and May 1994. A small crew installed more underground piping and electrical conduit and began formwork for the tank foundations in May 1994. During June and July 1994 no noteworthy work occurred. In August 1994 erection of the PEB and GEB started, and it continued into September 1994, when work on the exterior tank foundations also resumed. Tank foundation work continued intermittently through March 1995. In October 1994 and continuing into January 1995, FWEI sandblasted and painted the structural steel for the PEB and GEB. When this was completed, FWEI resumed the erection of the PEB and also began pouring floor slabs and equipment pads in the PEB. The setting of process equipment began in December 1994 and continued through July 1995. In January 1995 above ground electrical installations commenced, and this work continued through the year. Process piping work began full-time in February 1995 and also continued through the year. Erection of the welded steel storage tanks occurred between late March 1995 and early August 1995 and was followed by field painting and hydrotesting of the tanks. Installation of the catwalk and stairways began in July 1995 and continued through the fall. Between June and November 1995, potable water piping, HVAC, and process instrumentation and controls were being installed. Permanent utilities to the plant were run intermittently beginning in August 1994 and ending in summer 1995.

FWEI focused on the testing of process equipment beginning in October 1995. This testing culminated in late February 1996 with the successful completion of the seven day PLC test. Between February 1996 and August 1996, FWEI investigated and corrected the ground water force main installation, which had failed the required hydrotest on multiple occasions. Additionally, FWEI performed punchlist-type work at the plant. After receiving the certificates of occupancy for the PEB and GEB, FWEI introduced ground water to the plant in late October



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1996. Start-up continued intermittently until FWEI left the site in February 1997 without successfully completing it.

Also in 1996, certain portions of the cap surface water controls failed and were repaired. Some repairs were made by FWEI, but most were done by a contractor hired by OBG when FWEI refused to perform the work. OBG's repair work began in late August 1996 and continued until early December 1996. While this work was ongoing, FWEI seeded landfill cap areas outside the OBG work area and also placed densely graded aggregate on the perimeter road. FWEI demobilized in separate phases in January and February 1996, in November and December 1996, and in late February 1997.

In February 1997 OBG was contracted by the State to mothball the plant until certain construction items were completed. OBG completed the items by early June 1997, at which time O'Brien & Gere Operations, Inc. recommenced start-up. When start-up ended, the operational and functional period began on September 23, 1997 and continued for one year.

OBG declared Substantial Completion of the project on September 20, 1997 when it completed plant and landfill-related punchlist items that FWEI did not complete. Subsequently, OBG performed work required for Final Completion of the project; however, some of the work was deferred because, in part, it could best be performed at a later date when equipment was disassembled. As a result, Final Completion was not declared. OBG demobilized from the site in December 1997, although an operations staff from O'Brien & Gere Operations, Inc. remained on site through most of September 1998.

In summary, when Substantial Completion was declared on September 20, 1997, the project was delayed 810 days beyond the revised Substantial Completion date of July 3, 1995 and 907 days beyond the original Substantial Completion date of March 28, 1995. Of the 907 days of delay beyond the original Substantial Completion date, Mr. Barba concluded in his expert report that FWEI was liable for 786 days, or eighty-seven percent, of the delay. The remaining period of delay was attributed to NJDEP or OBG (ninety-six days or eleven percent), USEPA pollution indemnification (sixteen days or one percent), and excusable weather delay (nine days or one percent).





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### VIII. Images

#### List of Images

- Image 1. Aerial view of landfill looking west prior to construction. March 31, 1993.
- Image 2. Aerial view of south central portion of landfill. August 25, 1994.
- Image 3. Aerial view of landfill during construction looking northeast. August 25, 1994.
- Image 4. Aerial view of treatment plant under construction. August 25, 1994.
- Image 5. Aerial view of landfill looking west during construction. May 30, 1995.
- Image 6. Aerial view of treatment plant under construction. May 30, 1995.
- Image 7. Aerial view of site looking north. Circa 2009.



Image 1. Aerial view of landfill looking west prior to construction. March 31, 1993.





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Image 2. Aerial view of south central portion of landfill. August 25, 1994.



Image 3. Aerial view of landfill during construction looking northeast. August 25, 1994.





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Image 4. Aerial view of treatment plant under construction. August 25, 1994.



Image 5. Aerial view of landfill looking west during construction. May 30, 1995.





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Image 6. Aerial view of treatment plant under construction. May 30, 1995.



Image 7. Aerial view of site looking north. Circa 2007.